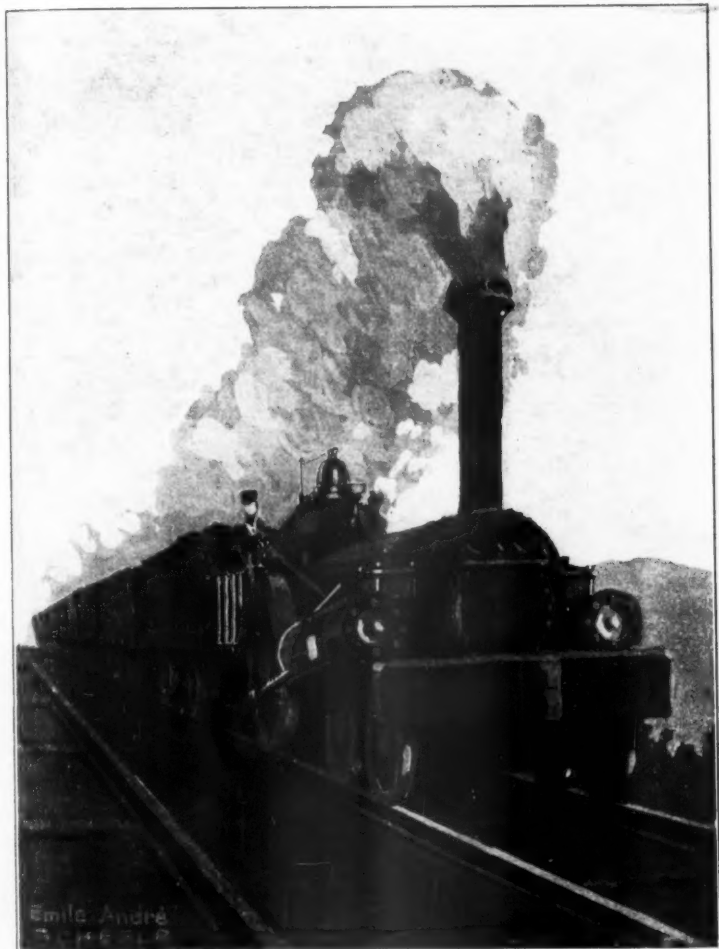


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BULLETIN No. 10



THE RAILWAY AND LOCOMOTIVE
HISTORICAL SOCIETY

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THE RAILWAY
AND LOCOMOTIVE HISTORICAL
SOCIETY



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Officers & Directors of the Railway & Locomotive Historical Society.

CHAS. E. FISHER, *President*,
6 Orkney Road, Brookline (46), Mass.

HERBERT FISHER, *Vice President*,
Box 584, Taunton, Mass.

J. W. MERRILL, *New England Vice President*
40 Kilby St., Boston, Mass.

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18 West St., Norwood, Mass.

F. W. MARTIN, *Corresponding Secretary*,
17 East 42nd St., New York, N. Y.

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2700 F St., Sacramento, Cal.

NORMAN THOMPSON, *Canadian Representative*,
Box 2004, Winnipeg, Manitoba, Canada.

Railway and Locomotive Historical Society.

COMMITTEE IN CHARGE OF PUBLICATIONS.

CHAS. E. FISHER, *Editor*,
6 Orkney Road, Brookline, Mass.

HERBERT FISHER,
Box 584, Taunton, Mass.

J. W. MERRILL,
40 Kilby St., Boston, Mass.

C. L. WINEY,
17 East 42nd St., New York, N. Y.

Additional copies of this bulletin can be procured from the Editor.

Those who have read the interesting accounts of the celebration of the one hundredth anniversary of the railway in England, last July cannot help but feel impressed with this mighty spectacle. For months the London & North Eastern Ry., into which the Stockton & Darlington is now merged, prepared for this event. Ancient rolling stock and every possible memento of early railways and of Stephenson was either used in the parade or the exhibition at the shops. The fact that nearly a quarter of a million people came to the celebration was doubtless something of a recompense to the London & North Eastern which spent nearly \$500,000.00 in staging this event. For more than an hour, a procession six miles long rolled by the grandstand. It was in truth one hundred years of progress that puffed its way down the old line of the historic Stockton & Darlington Railway for not only were old locomotives well represented in this parade but the more modern ones as well. It was a spectacle of which the London & North Eastern Ry. should feel proud.

Another feature has been suggested that is well worth the consideration of our members, a brief historical sketch and reproduction if possible, of the first locomotive that entered service on our earlier roads. The list of locomotives owned in this country in 1838 that appeared in our No. 6 Bulletin gives us

a good foundation to start on. There are however, early English engines that came to this country not mentioned in the list, whose history is obscure. Mr. Bishop not long ago listed a few of these engines and there are doubtless others. Such information as can be obtained will appear from time to time and any assistance that our members can give will surely be appreciated.

The account of the Norris Locomotive Works that appears in this issue may not be new to some of our members. It was felt that this account was worthy of reproduction in our paper so as to be included in the several accounts of the different locomotive builders. The account of the Norris engines that went to the Birmingham & Gloucester should be of interest to those of us here. Mr. Schefer, one of our members, selected one of these engines for our cover design.

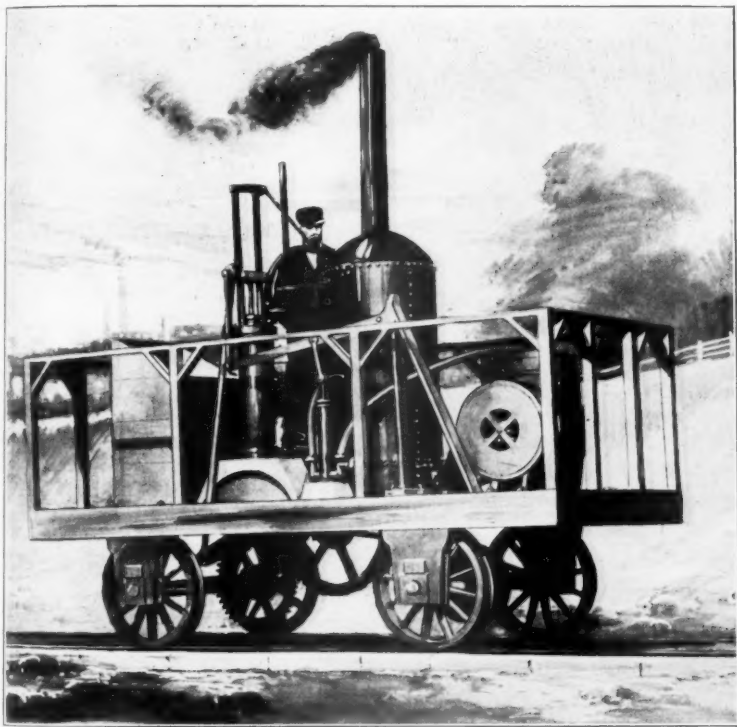
Treasurer of this Society, was received. Mr. Loomis was the first treasurer this Society had. His illness last spring as the result from his own and outside photographic work made him feel that he could not devote the proper time to the financial affairs of this Society.

A recent despatch from Baltimore stated that on a siding of the Western Maryland Railroad was found the old railroad coach in which President Lincoln rode to Gettysburg to deliver his famous address on that battlefield. The car is a wooden passenger and baggage coach, with a stove in the center and was considered the road's finest piece of equipment in 1864. A committee has sought to have this coach removed to Gettysburg and preserved as a historic memorial.

Notes on Early Baltimore & Ohio Engines and Models.

On August 28, 1830, Peter Cooper's small experimental locomotive made the trip from Baltimore to Ellicott's Mills and return with a car carrying thirty passengers. This was undoubtedly the first locomotive built in America. As shown in

the reproduction, the engine consisted of an upright boiler, mounted on a frame supported by four wheels. The engine had a single working cylinder of about three and one-half inches in diameter. Power was secured by means of gears. The boiler was tubular, anthracite coal was used as fuel, an artificial draught being created by a fan placed in the firebox of the loco-

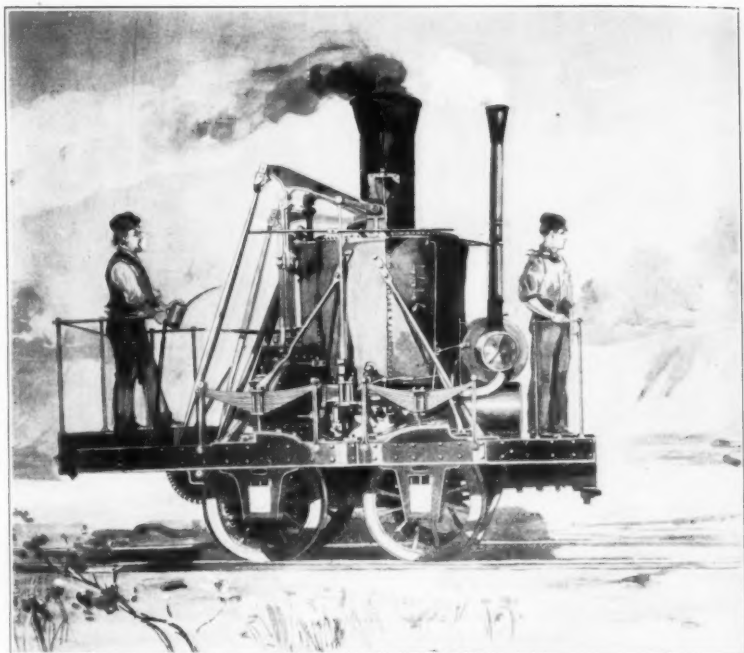


Peter Cooper's "Tom Thumb." B. & O. R. R. The first Locomotive built in America. 1830.

motive driven by a belt passing around a wooden drum attached to one of the road wheels and a pulley on the fan shaft.

The success of Peter Cooper's "Tom Thumb", as the above engine was called, led the Baltimore & Ohio to offer a prize of \$4,000.00 for the best engine meeting the following require-

ments,—it must not exceed $3\frac{1}{2}$ tons weight, and must be capable of drawing 15 tons on a level, fifteen miles per hour. The engine was to be delivered for trial not later than June 1, 1831. The locomotive "York", built by Phinas Davis (Davis and Gartner) of York, Pa., won this prize. The engine was mounted on wheels like those of the common cars, thirty inches in diameter, and the velocity was obtained by means of gearing with a



The "Atlantic." B. & O. 1832.

spur-wheel and pinion on one of the axles of the road wheels. The fuel used was anthracite coal. A model of this locomotive is owned by the Baltimore & Ohio Railroad.

The "Atlantic" was built by Messrs. Davis & Gartner and placed in service in September, 1832. The weight of this engine was $6\frac{1}{4}$ tons. About four tons rested on the two "road wheels", which were three feet in diameter. The diameter of

the driver was 28 inches and pinion 14 inches. The cylinders were 10x20 inches. This locomotive is still preserved by the Baltimore & Ohio and the engine is capable of making steam. Of recent years it has been exhibited at different places in connection with different anniversaries and events and has always attracted a wide interest. This locomotive remained in active service until 1892, its latter days being spent in switching cars around the Mount Clare Yard at Baltimore.

A model of the first railroad car in America, drawn by horses, and used in 1829, is also preserved by the Baltimore & Ohio.

Locomotives of the Long Island Railroad.

By INGLIS STEWART.

Locomotives of the Long Island Railroad in the order of their entrance upon service. Data concerning them so far as ascertained to October, 1915. The numerals at left of name are merely for convenience in indicating the probable sequence. No attempt has been made to carry the description beyond the "Lakeland".

1. ARIEL.

This was constructed in November 1835 by Matthias W. Baldwin at Philadelphia, Pa. It was the 19th made by him and was ordered by the Brooklyn and Jamaica R. R. Co. The exact date of its receipt by that railroad is not known, but was probably about the date above stated. The road was formally opened April 18th, 1836, and although the Long Island Farmer described the event, the names of the locomotives drawing the excursion trains are not given. Shortly after this, May 1st, 1836, the Brooklyn and Jamaica R. R. was leased to the Long Island and thence forward the "Ariel" became a Long Island R. R. locomotive. It is scheduled by name in the mortgage given by the Long Island R. R. to the State of Michigan in 1840, as can be seen by reference to the record in Liber 68 of Mortgages, in the office of the Register of Kings County, N. Y. The "Ariel" remained in service till 1855.

The "Ariel" weighed 7 tons; cylinders 10x16 inches; 1 pair driving wheels behind fire-boxes; drivers' diameter 4 ft. 6 in.; diameter of boiler 38½ inches; length of fire box 2 ft. 4½ in., width 3 feet, depth 2 ft. 8½ in., length of flue 6 feet 3 inches; diameter of flue 17⅞ inches; number of flues 84. Abraham Ayres was its first engineer. He was on the road many years. The following is a notice of its trial trip:

Newspaper Account of Trial Trip.

The Democrat, Wednesday, February 3, 1836.

Brooklyn and Jamaica Railroad.—We are gratified to learn, as we do from the L. I. Star, that the above-named road is completed and will be open for use as soon as the snow leaves us.

On Friday last, a trial was had on the railroad, of a new and very fine locomotive engine from Philadelphia. About a mile of the road had been cleared of snow, and the engineers with a number of gentlemen got upon a car at Bedford, near the house of Judge Lefferts, and traversed the road in a very rapid manner.

The engine cost \$7,000 and is called Ariel, and another called Post Boy will be put on when the road opens.

A new boat intended for the South Ferry to run in connection with the Railroad, was launched on Friday last from the shipyard of Brown & Simonson, New York.

2. POST BOY.

This was built for the Brooklyn and Jamaica R. R. Co., in March, 1836. The Baldwin Locomotive Works advise that it was a duplicate of the "Ariel". I have not been able to find, as in the case of the "Ariel" a description of the parts. The history of this locomotive is the same as that of the "Ariel", so far as the mortgage to the State of Michigan is concerned. Elizur B. Hinsdale, who as Secretary of the Long Island Railroad published a pamphlet giving a history of the various corporations merged in the Long Island R. R., refers to the collision between the "Ariel" and the "Post Boy". It is stated

that it was taken to pieces and sold in 1852. I have a belief that it was renovated at the works of Seth Wilmarth, South Boston, and became the "Post Boy" which arrived at Savannah, Ga., in 1852, and was used by the Central R. R. and Banking Co. as a shifting engine, later working on the Southwestern of Georgia R. R. as a gravel engine through the Civil War. I have not been able to prove this positively.

In the autumn of 1852 the Central R. R. & Bkg Co., of Georgia, procured a small locomotive for shifting in the yard. It was called "Post Boy". No details were given. In 1853 the Central sold it with other light locomotives to the Southwestern R. R. of Georgia, which listed it as a Wilmarth and in passenger service. It continued on the Southwestern through the Civil War. John J. McDonough, who later became Mayor of Savannah, lived as a lad on the line of the road and remembered the "Post Boy" distinctly, having ridden on it many times. It was a single driver. In 1866 I learned that it was hired by the Macon & Brunswick R. R. and handled construction work. Mr. McDonough's father bought it and used it on a branch running out from his saw mill to the timber. He owned it a long while and then sold it to the Savannah, Skiddaway & Seaboard R. R., where it resumed passenger service. This was about 1876. It was sold to a sawmill at Gardi, near Waycross, and was still at work in 1881, when Mr. J. J. McDonough lost sight of it.

3. HICKSVILLE.

This was built by the proprietors of the Locks & Canals Co., at Lowell, Massachusetts, Geo. W. Whistler, Manager, and in 1836 began service on the L. I. R. R. Whether it came direct to the L. I. R. R., or had been in service elsewhere earlier than 1836 I have been unable to ascertain, but am inclined to think it came direct from the Lowell Shop. It was scheduled as embraced in the State of Michigan mortgage. The only details that have been discovered are the following: Weight 7 tons, cylinders 11x16; 1 pair drivers 5 ft. in diameter. It seems not to have run after 1848, but was owned as late as 1853. It was then deemed not worth repairing. Its disposition could not be ascertained. It is criticised by Knight in his notes in 1839, but not by name. The only reference to it by name that I have been able to find is the following contained in the Long Island Democrat. The date, it will be noted, is printed erroneously "1827".

Wednesday, April 26, 1827.

Steam Whistle.—One of our contemporaries is loud in his praise of the steam whistle attached to the locomotive upon the Boston and Providence railroad. The locomotive Hicksville running upon the Brooklyn and Jamaica railroad has carried one for some months; but we never thought it was worth bragging about; since our friend thinks so much of it, we will give our distant readers an idea of it. It has a large brass whistle blown by steam for the purpose of giving notice of the approach of the cars. It makes a shrill, wild unearthly sound something like drawing a saw flat way across a bar of iron.

An incident occurred a few days since at about the time of starting from the depot in this village, which afforded some amusement to the passengers present. An old gentleman had just taken his seat; it was his "first ride upon the railroad;" he gave his opinion freely about the danger of railroad riding; about the locomotive running off the track—running over cattle, hogs, etc., just at this moment the engineer gave the signal for "all to be ready" by starting the whistle, "There, there", said he, "another hog killed!" Off went the cars and another blast from the whistle. "There, there, another hog killed, what in nature do they mean?" The passengers endeavored to explain the matter, but he knew too well about it to hear any explanation. By this time the cars had arrived at the crossings. The whistle was heard several times in quick succession. The old gentleman was now terrified. "Another hog killed, stop, let me out, the cars will run off the track and upset us all. Another hog killed. Let me out." After awhile the passengers succeeded in explaining the cause of the noise, and the old gentleman consented to trust him.

At this point of the narrative a clipping of something on the other side of the page had been taken and the conclusion of the anecdote can be surmised only.

I think the contemporary referred to in the foregoing article may have been the Delaware Gazette. I find the latter quoted by the Boston Daily Advertiser of November 23rd, 1836, as commenting on the steam whistle carried by "the Susquehanna, a locomotive designed by Mr. G. W. Whistler of Lowell and tried Tuesday afternoon on the Wilmington and Susquehanna

railroad," the Gazette goes on to say that this steam whistle "gives awful notice a mile away."

I think the L. I. Democrat may have written "Boston and Providence R. R." inadvertently, meaning "Wilmington and Susquehanna railroad." The two locomotives came from the Locks and Canals Company at Lowell and evidently were built very nearly at the same time. The Boston and Providence had no Locks and Canal locomotives until several years after 1837.

4. JOHN A. KING.

A very interesting locomotive credited to the Poughkeepsie Works. The Poughkeepsie Locomotive Company was the first concern chartered to construct locomotives and was too far in advance of the times. \$100,000 was sunk in these works by the shareholders, all of which was lost. This locomotive built in 1838 and the only one constructed by the Works was shipped by sloop to Brooklyn and its long life shows that it was very well constructed. It came under the name "Taglione" evidently in allusion to Taglione, the European dancer who was exhibiting in 1838 in the United States, and I have not been able to ascertain the exact date when the name was changed to John A. King but surmise it was in 1841. The following is what is said of the arrival of the "Taglione" by the Long Island Farmer:

Jamaica, July 3, 1839.

Railroad—4th July. The new locomotive, Taglione, will be placed upon the road tomorrow, and the Branch to Hempstead will also be opened, making it very convenient for people attending the celebration at that village. Besides the regular trips, a train will be despatched from Brooklyn at half past seven and at 11 a. m. for Hempstead and intermediate places. A return train will also leave Hempstead about 6 o'clock p. m. for Brooklyn, extra trains will also be despatched from Jamaica to Brooklyn at a quarter past six and 10 o'clock a. m.

The "John A. King" was not included in the mortgage held by the State of Michigan and it can be surmised that its ownership had not vested in the Long Island R. R. at that time but that when the lien was discharged and the road became absolute owner the name was changed. It rendered excellent ser-

vice till 1868, and was the best known of any of the early locomotives. Probably the popularity of ex-Governor John A. King, who lived in Jamaica and was president of the Brooklyn and Jamaica R. R. had something to do with this favor, but even so, the long service shows that this locomotive was exceptionally well constructed. In 1861 it was on the Day Book of the Round House at a valuation of \$1200. Mr. Charles J. McMaster of the Rutland R. R. recalled that this engine was in the Hunters Point Round House in 1867. In the spring of 1869 the "John A. King" was taken apart at Hunters Point and the material sold.

Boiler diameter 33 inches, length of fire box 2 ft. 1 $\frac{3}{8}$, width of box 3 ft. 6 in., length of flue 7 feet 3 inches. No. of flues 96, weight of engine 7 tons, cylinders 11x6. 1 pair drivers 5 ft. in diameter, capacity of tank 600 gallons, woodburner long and tapering stack.

5. CHICHESTER.

This locomotive is credited to Henry R. Campbell of Philadelphia and to have been on the L. I. R. R. since 1842. The references to it are few. In 1848 it was not running. In 1853 it had been dismembered and there was no intention of repairing it. It weighed 11 tons, cylinders 12x16, 2 pairs of drivers, 4 feet in diameter.

It is my belief that it was originally built by Baldwin, Vail & Hufty (shop No. 143) for the Annapolis & Elk Ridge R. R. in 1840 and then carried the name "Annapolis." This engine was seized on execution in 1842 and sold and appears to have been altered from a single driver by Mr. Campbell to his type of engine with four drivers and four front wheels. Possibly he was the purchaser at the execution sale and after alteration may have been the seller thus giving the L. I. R. R. the impression that he built the engine. Presumably the name "Chichester" was bestowed in honor of Abner Chichester, an advocate of the construction of the Long Island Railroad.

6. CRABB.

I believe that Baldwin, Vail & Hufty built this for the Annapolis & Elk Ridge R. R. (shop No. 141) in 1840 as the "Carroll." The "Carroll" had the fate of the "Annapolis" and it

seems probable that it took the name "Crabb" and came on the L. I. R. R. in 1842. It weighed 11 tons, cylinders $13\frac{1}{2} \times 16$, 1 pair drivers 3 ft. 6 in. diameter. The subject of this engine is involved in obscurity. It is my belief that it became the

7. BROOKLYN.

It is stated that the "Brooklyn" was rebuilt by the Long Island Company. Weight 12 tons, cylinders $13\frac{1}{2} \times 16$, 3 pair of drivers, 3 ft. 3 inches in diameter, 6 wheel connected. Other dimensions are: Boiler diameter 40 in. Length of fire box 4 ft. $3\frac{1}{2}$ in., width 3 ft., depth of fire box 2 ft. $9\frac{3}{4}$, length of flue 10 feet, diameter of flue $2\frac{1}{2}$, No. of flues 56, weight (probably with tender) 18 tons, capacity of tank 1000 gallons. The "Brooklyn" was in service in 1859 but I have not traced it beyond that date.

8. BROOKS.

Rogers, Ketchum & Grosvenor. Long Island Farmer April 30, 1844, says, "We also noticed a very large and powerful new locomotive the "Brooks." Rebuilt by L. I. R. R. in 1853, disappears between 1857 and 1859. Boiler $37\frac{1}{2}$ inches diameter, length of fire box 3 ft. 4 in., width of fire box 2 ft. 11 inches (?) depth of fire box 3 ft. 6 in., length of flue 8 ft. 9 inches, diameter of flue $1\frac{1}{2}$ inches, No. of flues 131, weight 15 tons, cylinders $11\frac{1}{2} \times 20$, 2 pair drivers, 5 ft. in diameter; capacity of tank 900 gallons.

9. FISKE.

Rogers, Ketchum & Grosvenor. Named after Geo. B. Fisk (Alderman Fisk as he was usually called owing to his political activities in Brooklyn when he filled that office). He was President of the L. I. R. R. in the 40's and it was due to his efforts that the road was completed to Greenport and became a part of the route between Boston and New York. A paragraph in the Long Island Farmer on September 24th, 1844, states, "A new locomotive the 'Fiske' (built by Messrs. Rogers, Ketchum & Grosvenor of Paterson, N. J.) ran over the road on the 18th

inst. from Brooklyn to Greenport 96 miles in three hours and fifteen minutes less two five minute stops." The same journal in its issue of November 4, 1856, mentions a collision of the "Brooks" and "Fiske" the early morning of November 3, 1856, in a fog a little way east of Jamaica. Its last work was ballasting the branch from Manor to Sag Harbor. The engine lay outside the Round House at Hunters Point and was taken apart and material sold in 1869. Its dimensions were the same as the "Brooks" except 133 flues and cylinders 12x20, capacity of tank 1200 gallons.

9. JAMES H. WEEKS.

Baldwin & Hufty make. Came on the road in 1844. The Baldwin Locomotive Works report that while they have no record of the "James H. Weeks" on their books they did make in 1844 for the Long Island Railroad the "Edwin Post." Doubtless on arrival the locomotive carried the name "Edwin Post" and subsequently the name of "James H. Weeks" was substituted. The "James H. Weeks" was in service till 1862 when it was given in exchange for a locomotive named "Len Crossman" and left the road.

The Baldwin Locomotive Works describe the "Edwin Post" as "Class 12 ton C two pair drivers—the forward pair combined with the leading wheels in a flexible beam truck. Drivers 60 inches in diameter. A fairly complete drawing of the class is said to be in the Archives of the Works and to bear the date 1843. Locomotives of this class are stated to have had Bury dome boilers and cylinders 12½x16.

The "James H. Weeks" weighed 14 tons, boiler 39 inches in diameter, fire box 3 ft. and ¾ in. long; 3 ft. 1⅛ in. width; 3 ft. 9 inches deep; flues 8 ft. 4 in. long, diameter of flues 1¼ in. number of flues 109, cylinders 13½x16, 2 pair drivers; 5 ft. in diameter and tank 1500 capacity and was on the Day Book of the Round House as valued at \$3,000.

The "James H. Weeks" after leaving the Long Island R. R. went into service on the Raritan & Delaware Bay R. R. and worked several years. The date of retirement has not been ascertained.

10. ELIHU TOWNSEND.

NORRIS BROS. Carried the name of a member of the firm of Nevins, Townsend & Co., Bankers, in New York City. He was director in nearly all the local railroads of the 40's. Built at Philadelphia in 1844. Not much is on record concerning the performances of this locomotive. The L. I. Farmer August 12th, 1856, states "the engine house at Hempstead was consumed and with it the Locomotive 'Elihu Townsend.' "It is insured." It was probably not seriously injured for it ran a long time. It is stated by Mr. Samuel Booth that it was rebuilt by the company in 1865 and named "Richard Schell." Its ultimate fate has not been ascertained. Boiler 39 $\frac{5}{8}$ inches in diameter; length of fire box 3 ft. 3 $\frac{1}{4}$ inches, width 2 ft. 11 inches, depth 4 ft. 5 inches; flues 9 ft.; diameter of flues 1 $\frac{7}{8}$ inch.; number 102; weight, 17 tons; cylinders 12 $\frac{1}{2}$ in.; 2 pairs of drivers 5 ft. diameter, tank capacity 1500 gallons. On the Day Book of 1861 at valuation of \$4,000.

11. DERBY.

Hinkley & Drury, Boston, 1844. Named after Elias Haskett Derby, a railroad manager of those days, coming from the Philadelphia and Reading R. R. and in 1848 President of the Old Colony R. R. No reference to this locomotive has been encountered in the L. I. Farmer. Boiler 40 inches in diameter; fire box 2 ft. 6 in. long; 3 ft. 4 in. wide; 3 ft. deep; flues 9 feet 6 inches long; diameter of flues 1 $\frac{5}{8}$ inch.; number of flues 121; weight 16 tons, cylinders 13 $\frac{1}{2}$ x20; 2 pairs drivers 5 ft. 9 in.; capacity of tank 1200 gallons.

The disposition of this locomotive has not been ascertained. It was nearly worn out as early as 1853 but was retained on the road as late as April 1859.

12. BOSTON.

Hinkley & Drury, 1845. No references to this locomotive have been encountered in the newspapers. It was on the Round House Day Book of 1861 at a valuation of \$1500.

Boiler 41 inches in diameter; fire box 2 ft. 4 $\frac{3}{4}$ long; 3 ft. wide; 3 ft. 11 $\frac{3}{4}$ deep, flues 10 ft. long; diameter of flues 1 $\frac{5}{8}$ inch.; number of flues 121; weight 17 tons; cylinders 14x20; 2 pair of drivers 6 ft. in diameter; capacity of tank 1200 gallons.

13. LITTLE.

Norris Bros., 1845. Named after Jacob Little, a prominent operator in railroad stocks and director in many corporations of the time. For some reason, no longer known, the name was changed to "Fanny." This occurred between 1849 and 1853. It was said by the late Avery T. Brown that the name referred to Fanny Elssler, a noted dancer of the time. A very well known locomotive in fast passenger service. Its ultimate history uncertain. Mr. Isaac D. Barton told me an engine (single driver Norris) was on the road when he first became superintendent in 1867 but he had forgotten the name. Whatever this locomotive was it is unlikely it could have been the "Fanny" and as he spoke of its ballasting the Sag Harbor Branch, it is likely that he confused it with "Fiske."

Boiler 39½ inches in diameter; fire box 3 ft. 3⅝ inches long; 2 ft. 10 in. wide; 4 ft. 4 in. deep; flues 9 ft. long; diameter of flues 1¾ inch; number of flues 108; weight 15 tons; cylinders 12½x20, 1 pair of drivers; 5 ft. 9 inches in diameter, capacity of tank 900 gallons.

Excerpt from Whig (Troy, N. Y.) Thursday, June 26, 1845
(doubtless taken from an Exchange)

A New Engine.—One of the most strongly and beautifully constructed engines we ever saw passed our office on Saturday. We were informed that it was built expressly for high speed for the Long Island Railroad Company to make the trip between Brooklyn and Greenport, 97 miles, in 2½ hours with 300 passengers including all stopages. Weight of engine in running order, 29000 lbs.; cylinders 12½ inches diameter, 20 inches stroke. Two driving wheels 69 inches diameter; four guide wheels 33 inches diameter; two relief wheels 36 inches diameter. A handsome gallery extends around the engine giving a foot-path for the engineer to walk around with safety.

* * * *

(speaks of a second engine just like it now building for the same road).

14. RUGGLES.

Norris Bros. Named after Henry Ruggles, a prominent railroad director of the period living in New York City. It

was built at the same time as the "Little" (Fanny) and the description is the same except tank had a capacity of 1200 gallons.

The "Ruggles" seems to disappear in 1860 for I do not recall it on the Day Book of 1861 kept at the Round House, Hunters Point.

15. NEW YORK.

Rogers, Ketchum & Grosvenor 1845. No reference to this has been encountered in the L. I. Farmer. It was on the Day Book of 1861 at \$4000 and carried the name in 1863 but has not been traced further. If I am not mistaken, the "New York" that I saw when a child, came over from the Flushing railroad for service temporarily. It was then a straight scarlet stacked coal burner in passenger service. Mr. C. J. McMaster who was on the L. I. R. R. in 1867 thinks that the one seen by me was the "New York" hired from the New Jersey R. R. & Transportation Co. and later sent to the Flushing R. R. The difficulty with this statement is that the N. J. R. R. & T. Co. did not have an engine named "New York" according to the engine list. The "Manhasset No. 3" a Danforth, Cooke engine and the first on the Flushing road had a 6-wheel tender and may have come from the N. J. R. R. It was the first engine to run through from Hunters Point to Flushing. It came to that road second hand and from my recollection of its appearance I think it must have been one of the earliest of the Danforths. Mr. McMaster stated that the New York was beautifully decorated and had a six wheel tender, Boiler (1845 Machine) $37\frac{1}{2}$ inches in diameter; fire box 3 ft. 6 in. long; 2 ft. 10 in. wide; 4 feet deep; flues 8 ft. 9 inch. long; diameter $1\frac{1}{2}$ inch; number of flues 133; weight 17 tons; cylinders $12\frac{1}{2} \times 20$; 2 pair drivers; 6 feet diameter; capacity of tank 1200 gallons.

16. MOSES MAYNARD.

R. K. & G. 1851. Named after Moses Maynard, Jr., the secretary of the Long Island R. R. A well known locomotive. Given a notice in L. I. Farmer February 26, 1855.

Boiler 40 inch in diameter, fire box 3 ft. 10 in. long; 3 ft. 1 inch wide; 4 ft. 4 inch deep; flues 10 ft. 10 inch long; diameter

of flues $1\frac{1}{2}$; number of flues 135; weight 20 tons; cylinders $14\frac{1}{2} \times 20$; 2 pairs drivers 5 ft. 6 in; tank capacity 1500 gallons.

Samuel Booth, Esq., stated that the "Moses Maynard" was rebuilt by the Schenectady Locomotive Works and returned named "Jas. Gordon Bennett". Later the name was dropped and it went by the designation "No. 25".

Mr. Booth related to me that a number of the old locomotives were given in part payment for new Baldwins. "No. 25" was on the list but the men were so attached to it an effort was made to evade the draft. Later checking up revealed the absence of "No. 25" and a peremptory order issued for its appearance. The rebels had to yield. They decided to have it neatly painted and its "No. 25" replaced. This was done and a fine photograph taken of their favorite before final departure from the road which it had served so many years.

17. LONG ISLAND.

R. K. & G. 1852. Mentioned several times in L. I. Farmer in connection with accidents. It was running under this name in February 1867. Its history not ascertained after 1867. It was a counterpart of the Maynard except cylinders 14×22 ; drivers 6 feet.

18. PECONIC.

Seems not to have figured in the L. I. Farmer items. History is obscure. Went out of service 1869 and was broken up at Hunters Point. Built at Philadelphia 1853 by Norris & Son.

Boiler 39 inch in diameter; fire box 3 ft. 6 in. long; 3 ft. wide, 3 ft. 4 in. deep; flues 10 feet long; diameter of flues $1\frac{3}{4}$ inch; number of flues 90; weight 16 tons; cylinders $12\frac{1}{2} \times 24$; 2 drivers; 5 ft. diameter; tank capacity 1200 gallons.

19. WYANDANK.

M. W. Baldwin constructed this October 1853. It was graded by him as "Class 21 ton 6 wheel D," that is to say, all the wheels were connected and no truck. The driving wheels were 40 inches in diameter and the cylinders were 16×24 . In this form it was found the weight was not well distributed and in 1856 it was converted into an eight wheel locomotive and as such was rated one of the best on the road. The name was taken

from one of the sachems of the Montauk Indian tribe. The L. I. Farmer of March 11, 1862, states; "The 'Wyandank', one of the best locomotives on the Long Island Railroad, was sold on Friday last by the Company to the Government of the United States. She is to be placed on the Ohio & Baltimore Railroad and is being put in complete order for that purpose." The military career of the "Wyandank" was brief. Early in May she was drafted from the B. & O. R. R. and placed on the Richmond & York River R. R. In the retreat of McClellan June 28, 1862, it would seem that it was one of the locomotives run off the trestle into the Chickahominy River to prevent capture by the Confederates.

20. MONTAUK.

W. W. Swinburne, 1854. The "Montauk" had no visible counterweights on the drivers. Lead was placed in its spokes opposite the crank pin as counterbalance. It continued on the road under this name until 1874. It was then leased to Mr. Andrews, the contractor who was boring the Delaware, Lackawanna and Western R. R. tunnel at Hoboken, N. J. It did not return to the L. I. R. R. and its disposition has not been ascertained. In 1869 the road number 23 was assigned to the Montauk which previously had been without a number. Mr. C. J. McMaster alluded to this locomotive as "a direct action engine." Boiler 43 inches in diameter; firebox 3 ft. 11 inch long; 2 ft. 11 wide; 4 ft. 2 inches deep; flues 11 ft. long; diameter of flues $1\frac{7}{8}$ inches; number of flues 105; weight 20 tons; cylinders 15x20; 2 pairs of drivers, 5 ft. in diameter; tank capacity 1400 gallons.

21. ORIENT.

R. K. & G. 1854. Named after Orient Point at East End of the Island. Alluded to in Long Island Farmer July 22, 1856; "On Saturday last we counted 13 cars attached to the noble engine Orient, as she came steaming up to the station in the village." The history of this locomotive is obscure after 1863. Boiler 40 inches in diameter; firebox 4 ft. $1\frac{1}{4}$ long; 3 ft. wide 4 in. deep, flues 10 ft. $10\frac{3}{4}$ in. long; diameter of flues $1\frac{3}{4}$ inch.; number of flues 135; weight 22 tons; cylinders 14x20; 2 pair of drivers; 5 ft. 6 inch in diameter; tank capacity 1500.

22. ATLANTIC.

R. K. & G. May 1855 a counterpart of the "Orient". In 1868 given general repairs and renamed "Horatio Seymour."

23. NEBRASKA.

The Long Island Farmer May 27, 1856 alludes to the experiments being made with an engine of this name stating that it is the first to burn coal. It was on the road in 1857 but is not mentioned thereafter.

24. PACIFIC.

The Long Island Farmer states that it was received first week of June 1857. From Rogers Locomotive Machine Works and a counterpart of the "Orient". This locomotive remained until August 1869. It was placed on the Harlem Extension R. R. and when that company ceased to operate, passed to the Bennington & Rutland R. R. where it took the name "Manchester", road number "6". It was sent to Schenectady Locomotive Works for rebuilding and the drivers were reduced to 5 feet. It returned and was placed in the charge of the late Harvey Bowtell. It had a long career on the Bennington Road.

25. PHOENIX.

It is believed that the "Phoenix" was the next engine after the "Pacific". It was received February 14, 1860, from Rogers according to the L. I. Farmer which states that it weighed 25 tons, had 15 inch cylinders and 5 feet drivers—intended to burn coal. I remember this locomotive as carrying a very large stack such as was used for bituminous coal. The name in raised letters was carried on the boiler in a frame. Mr. McMaster related that the flues of the "Phoenix" leaked badly on one occasion but as no other engine was available he had to start the train with the "Phoenix". He directed his fireman to shovel brewers grains out of a car on an adjoining siding and throw a couple of shovelful into the tank. The grains almost immediately plugged the leaks and he made the run from Hunterspoint to Greenport on time. The "Phoenix" was on the road till 1873. It was then sold to a railroad at Peoria, Illinois.

It lacked the finish characterizing the Rogers engines of

its period having little brass work and seemed to be roughly finished. It was, however, a very reliable engine.

26. NASSAU.

Norris & Son. The Long Island Farmer refers to this as "just added" under date Dec. 11, 1860 stating it had 14 inch cylinders, 5 ft. drivers, weighed 24 tons and burned hard coal.

27. LEN CROSSMAN.

M. W. Baldwin. There are few particulars as to this locomotive. It was received in exchange for the "James H. Weeks" in 1862 and weighed 10 tons. Its name was printed on the cab. It was a very old engine when it came. Had a single pair of drivers. Broken up in 1865.

28. JAMES SEDGELY.

Built by the Northern (N. H.) R. R. in 1862, but sold for \$6450 on its completion to the Long Island R. R. Mr. Sedgely was Master Mechanic of the Northern and subsequently of the Michigan Southern and Northern Indiana R. R. Co. and from that went into the Lake Shore and Michigan Southern Ry. with headquarters at Cleveland, Ohio. The "Sedgely" was at first a woodburner. I have not ascertained the time when it was changed to coalburning but I recall that it was carrying a diamond stack in 1868, and that then it was an engine of fine appearance. In August 1869, it left the Long Island R. R. and was placed on the Harlem Extension R. R. and given the designation "Lebanon", later passing to the Bennington and Rutland R. R. under that name and with "5" as road number. It ran for many years on the B. & R. R. R. but I do not remember when it was demolished. I have been unable to obtain the dimensions of the "Sedgely".

29. HEMPSTEAD.

Taunton Mfg. Co. This was a ten ton dummy and came to the road in October 1862 to operate the Hempstead Branch. It was a type of locomotive which could be found in the period 1860-1870 in use for light passenger traffic. There were two or three like the "Hempstead" operating the Second Avenue Horse R. R. from Forty second street to Harlem in 1867 and

I used to see one on the Frankford & Holmesburg R. R. near Philadelphia in 1869. They were experiments and were not adopted permanently.

30. QUINCY.

A companion to the "Hempstead"—from the Hinkley Works—came about the same time. It weighed 18 tons.

Between 1863 and 1870 the history of the locomotives on the Long Island is obscure. The "Montauk", "Pacific", "Phoenix", "Sedgely" and the "Fiske" seem to have come through the period of seven years. Others such as the "Orient", "Maynard", etc., must have come through but I have been unable to identify them by my own knowledge with any of those that I knew after 1868. I will give the names of these later locomotives, all of which, at one time or another, I have seen.

Locomotives on the Long Island R. R. as of 1869.

22. Road Number; Glen Cove.

Small locomotive with 2 pair high drivers; outside connected, coal burner, diamond stack, used in passenger service. Came as a second hand engine, probably a Norris. A neat and beautiful machine. Avery T. Brown in 1884 seemed to think the "Glen Cove" was the "Nassau" renamed. Mr. Samuel Booth agreed with this view.

23. James Sedgely—referred to previously.

23. Montauk—referred to previously.

24. Richard Schell.

Avery T. Brown said this was once the "Orient". Mr. Booth said it was the "Elihu Townsend".

25. Horatio Seymour.

Avery T. Brown in 1884, said this was once the "Atlantic". Mr. Booth agreed to this statement of Mr. Brown.

26. Pacific—Referred to previously.

27. George F. Carman.

Charles J. McMaster in 1911 said this had been the "Albany

No. 27" of N. Y. & Harlem R. R. and had been brought by Isaac D. Barton to the L. I. R. R. A very fine engine, coal burner, carried a steam boat whistle of great power and fine tone. G. F. Carman lived at Riverhead, L. I. and was a director of the road. Mr. McMaster took this engine to the Harlem Extension R. R. in 1869 with the "Pacific" and the "Jas. Sedgely" and it did not return to the L. I. R. R. The "George F. Carman" retained the name throughout the remainder of its career on the Bennington & Rutland R. R. I understand it ran for many years. It seems curious that it should have been "27" in both Harlem & L. I. R. R. It was a Rogers.

28. Queens County.

History unknown, ran for many years on the Long Island. Two domes. Danforth, Cooke & Co.

29. Suffolk County.

Precisely like the Queens County, diamond stacked. Danforth, Cooke & Co.

30. Gen. Grant.

This is stated by L. I. Farmer to have come on the road in Autumn of 1865. As I recall, it looked like a Rogers engine; carried two domes. In service many years.

31. Gen. Sherman.

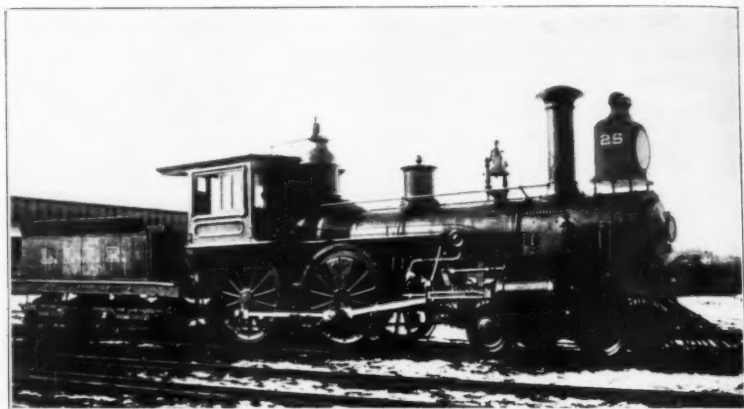
Same observations as in case of Gen Grant.

32. Fred.

This came as the dummy "Quincy" and I was told by Mark Brear the Master Mechanic in 1875 that it had been rebuilt in present form about 1864. Oliver Charlick, president of the road named it after his son. The stroke was 8x18 and drivers 40 inches in diameter—2 pairs of drivers, no leading trucks, tender short on four wheels, headlight box of copper, very small, with raised ornamental scrolling. The locomotive in 1871 was used as a construction engine and built the road from Rockaway Junction to Far Rockaway (now a part of the Montauk main line). Sold to the Canarsie R. R. about 1876 and further history not obtained.

33. James Gordon Bennett.

Mr. Samuel Booth stated that this was the "Moses Maynard" rebuilt at the Schenectady Locomotive Works. When names were dropped it became "No. 25". Sent to Baldwin Locomotive Works in part payment for new engines.



THE "JAMES GORDON BENNETT."

34. Aaron J. Vanderpool.

35. Horace Greeley.

36. James M. Waterbury.

These were McQueen engines from Schenectady and came in May, 1866. I think the shop numbers were consecutive—"Vanderpool" was No. 492.

37. Thurlow Weed.

38. Charles R. Lincoln.

These came June 18, 1867, from Schenectady Works. The "Charles R. Lincoln" carried its tanks along the boiler and had no tender—light passenger service—later name was changed to "Long Island City"—long in service.

39. Riverhead.

Duplicate of the "Charles R. Lincoln"—long in service.

40. Huntington.

Danforth, Cooke & Co.—This came to the Long Island about 1866 from the Brooklyn Central & Jamaica R. R. where it was called "William B. Hunter"—road number "1". The Long Island Farmer of July 28, 1861—announcing the acquisition of the "Jacob Frost" No. 2 by the Brooklyn Central & Jamaica R. R. stated it weighed 18 tons—was a coaler with drivers 5 ft. in diameter, and came to the L. I. R. R. on the breakup of the Brooklyn Central and Jamaica R. R. It was sold by the L. I. R. R. soon afterwards. The "William B. Hunter" was retained and was badged "Huntington" with road number "40". In the 70's this locomotive was given the extension spark box and straight stack and was used generally as a spare engine. It was very quick in getting under way and its lines were very beautiful. It was demolished in 1878.

No. 41.

This, while on the Long Island R. R., carried no name. It was in service only a short time in 1867 when it was sold to the South Side R. R. which had begun construction from Jamaica toward Patchogue. It left the rails and was ruined at Seaford soon after.

This locomotive is well known under the name of "Uncle Tom" and the photographs are met with frequently. It was built by Mr. Griggs of the Boston & Providence R. R. and competed under the name "Dedham" at Lowell, Mass. in 1851. I have been informed that it was sold to the Fitchburg & Worcester which in turn passed it to the Flushing R. R. of L. I. The latter road was about 1867 temporarily controlled by the L. I. R. R. and it was intended to place the locomotive on the roster of that road under road number "41". It lay several days on a siding at Jamaica before being dragged to the tracks of the South Side R. R. It left a distinct memory on my mind.

42. Woodbury.

Similar to the "Charles R. Lincoln",—McQueen Engine.

43. Northport.

Similar to the "Charles R. Lincoln"—McQueen Engine.

44. Alden B. Stockwell.

Schenectady Locomotive Works, No. 641—about 1871.

45. Charles A. Dana.

Schenectady Locomotive Works, No. 642—about 1871.

46. Corona.

I think this came from the Flushing Railroad and that it was built by the Cooke Locomotive Works—1871.

47. Peter Cooper.

Manchester Locomotive Works 1871. Very handsome. This was a beautiful locomotive, no pains having been spared in the adornment. The painting on the tender alone cost \$1500 so Mr. Samuel Booth told me. He ran the "Cooper" for awhile. Its career was brief owing to poor construction and it was scrapped after ten years of light service.

48. Benjamin W. Hitchcock.

Schenectady Works 1871 carried the name of a noted real estate operator—later became "Port Jefferson." In service about twenty five years. Splendid record. Very handsome.

49. Robert C. Brown.

Make not recalled—carried the name of a cigar manufacturer—later became "Deer Park".

50. St. Johnland. Schenectady Locomotive Works.

51. Lakeland. Schenectady Locomotive Works No. 993.

The "Lakeland", I believe, was the last of the locomotives acquired by the old company. Not long after this the L. I.; the N. Y. Flushing and North Side; the Central of L. I. and the Southern (formerly South Side) consolidated under the title of Long Island Railroad Company and new road numbering went into effect. After the unification names soon were discarded.

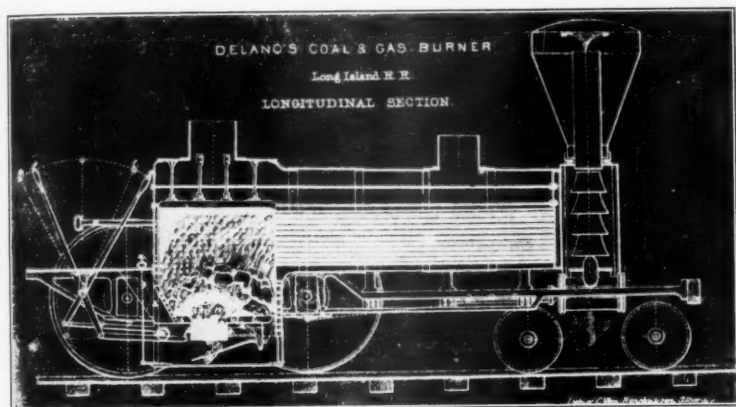
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The following account will be of interest in connection with the locomotive "Nebraska" mentioned by Mr. Stuart in his list of Long Island R. R. locomotives.

"At a meeting of the Railroad Convention held in the Astor House, New York, on Dec. 12, 1854, Mr. Horace Boardman, the patentee of the coal-burning locomotive was present being introduced by a letter from Mr. Joel W. White of the Norwich &

Worcester Railroad Company which was read into the convention.

'This may certify that your coal burner, called the "Nebraska", has been running on the road of this company to the extent of five thousand two hundred and eighty miles. The following is the relative expense of fuel, between coal and wood. The cost of wood per mile on the line of this road, at the average cost of \$4 per cord, is $14\frac{1}{2}$ cents per mile, being on 5,280 miles, \$765.60.



THE "NEBRASKA."

'Expense for bituminous coal per ton, (2,000) at \$6.50, cost per mile $11\frac{1}{10}$ cents, on 5,280 miles, \$586.08—difference \$179.52, net saving on 5,280 miles—making a net saving of $3\frac{4}{10}$ cents per mile, which on the ordinary year's running of an engine of 30,000 miles, would make a saving of \$1020 per year. The above estimates are made upon the actual cost of fuel the past year.

'The construction of your engine in burning bituminous coal, I am confident is of the most improved form to generate steam, at the same time avoid all inconveniences from smoke, which has been so far perfected, as to be less inconvenient to the passengers than the burning of wood.

'To the before mentioned might be added a saving of expense in help at the stations at wooding up, avoiding the ex-

pense of wood sheds; also, avoiding the hazard of fire on the line or the road, equal in amount by the sum of \$300 to each engine per year.

“Your engine has performed with perfect satisfaction both on passenger and freight trains, generating steam with facility and a readiness to be always prepared for action.” ”

The Norris Locomotive Works.

Permission to use this material has been granted by the “Railway Age.”

BY C. H. CARUTHERS.

To those in any way connected with American railroads from 1831 to 1868, the name of Norris, and the Norris locomotives, were very familiar, in fact continued to be so for almost a decade longer. To-day, however, they are but a memory, and many of the younger men on the various lines have but a vague idea, if any at all, of what these names represented to the men who have either passed away or are in the “sere and yellow leaf” awaiting the end of their life’s run.

The Norris firm was not only one of the first to engage in locomotive building, but forged rapidly to the front, until by 1861 or 1862, according to its badge-plates, it had probably built more locomotives than any other firm in America, and it retained this numerical superiority in construction until about the latter part of 1862, as is shown by the following table:

Date.	Engine.	Construction	
		No.	Builder.
..... 1850.....	John Stevens.....	420.....	Norris Bros.
January, 1850.....	Indiana.....	372.....	M. W. Baldwin
October, 1853.....	Loyalhanna.....	649.....	R. Norris & Son
“ 1853.....	Chester.....	551.....	M. W. Baldwin
“ 1858.....	210.....	912.....	R. Norris & Son
May, 1859.....	156.....	847.....	M. W. Baldwin & Co.
“ 1863.....	278.....	1,067.....	R. Norris & Son
“ 1863.....	258.....	1,094.....	M. W. Baldwin & Co.
“ 1864.....	348.....	1,178.....	R. Norris & Son
“ 1864.....	294.....	1,283.....	M. W. Baldwin & Co.

The John Stevens was built for the Camden & Amboy Railroad, and the others for the Pennsylvania.

It will be observed that according to this table the 649th, engine of the Norris works was built in 1853, and the 912th, in 1858; or a total of 273 engines in about five years; yet in 1855 the

firm built its 806th engine. Thus it appears that 178 of the 273 were built during three successive years and only 95 in the three years following. This was probably owing to the effects of the business depression of 1857.

The earliest mention which I have found of the Norris plant is that contained in an article entitled, "The Transportation of Passengers and Wares: A Visit to the Norris Locomotive Works," which appears in the "United States Magazine of Science, Art, Manufactures, Commerce and Trade," in the issue of October, 1855. This is evidently one of the most reliable sources of information available in connection with the history of the Norris works, and its compiler states at the outset that, "To make the matter understandable, the author has recently paid several visits to the extensive works of the Messrs. Richard Norris & Son, in Philadelphia, one of the largest and most perfect in all its appurtenances in this or any other city."

It is stated in this article, on page 158, that in 1830 Colonel Stephen H. Long, of the United States Army, received letters patent for "certain improvements in the construction of locomotives and other engines," but an error in the printed date is evident, as the records of the Patent Office show no issue of patents on locomotives to Colonel Long until December 28, 1832, followed by another on June 17, 1833. The statement follows that in 1831 Colonel Stephen H. Long, William Norris, General Parker, G. D. Wetherell and Dr. Richard Harlan formed a company called the "American Steam Carriage Construction Company," to build "Locomotors" (as they were then called) from the designs furnished by Colonel Long, and were intended to use anthracite coal as fuel.

The first one was built in the Phoenix Foundry at Kensington, Pa., now a part of Philadelphia, and was steamed up on July 4, 1832, for a test on the Newcastle & Frenchtown Railroad. It proved an utter failure on account of insufficient firebox and grate area, being obliged to stop at the end of each mile run in order to again raise steam to a working pressure.

No record appears of any attempt to substitute wood for anthracite coal in the engine after this failure, although such change might have produced better results. Perhaps the builders had taken for their motto, "Anthracite or nothing," and, like some experimenters in later years, sacrificed common sense on the altar of a pet theory.

A statement has been published that the original plans of Colonel Long embodied an engine having a four-wheel truck with a single pair of driving wheels, 60 in. diameter, and two sets of flues placed one in front of the other with a space about 20 in. wide between them to be used as a combustion chamber—an arrangement apparently like that used by Milholland in his first Pawnees—and a fan driven by the exhaust steam to increase the draught at pleasure of the engineman.

Whether this first engine was built on these lines, is not clear from the meagre data available, but in any case the failure of their virgin effort does not seem to have immediately discouraged the members of the firm, as in June, 1833, we learn that "Black Hawk" was completed and afterward burned anthracite coal successfully, first on the Philadelphia & Columbia railroad, and later on the Philadelphia & Germantown road. It is described as having a "detachable" firebox over which extended two cylinders or drums, notched at their centers and having flues 2 in. diameter and 7 ft. long carried from these notches to the smokebox upon which was placed a straight stack rising to a height of 20 ft. above the rail, but arranged with a device to permit lowering it when passing through bridges or under other low places. No other method of producing draught when standing was used.

By this time all the partners except Colonel Long and William Norris had withdrawn their interests. The firm then became known as Long & Norris, and in 1834 built three anthracite coal-burning locomotives for a New England railway. These three performed as well as engines from other works which were using wood as fuel, but they were soon relegated to sand and gravel trains because "the coal fires required more attention from the engineman than did fires of wood." Yet their service on these work trains is stated to have been economical!

Although the performance of "Black Hawk" has already been recorded as satisfactory, it could not have extended over one year, as the article in the magazine closes its reference to the three New England engines with these words: "and old 'Black Hawk' is still (1855) on its wheels, but in a perfect state of rest in which it has reposed twenty-one years." Probably the same reasons about the early retirement from service of this engine which affected the three in the land of the Pilgrims.

During 1834 public duties called Colonel Long from Philadelphia, and he sold his interest in the locomotive works to William Norris, who, soon after, completed "Star" for the Philadelphia & Germantown road, where it is said to have been satisfactory. Mr. Norris then abandoned the Kensington location and opened his shop in a small unoccupied stable on Bush Hill, Philadelphia!

His employees were six in number and their united weekly compensation amounted to but thirty-six dollars. Power to drive the machinery was obtained from the adjoining wheelwright shop of Rush & Mulenburg (the first named member of this firm being a son-in-law of Oliver Evans, well known as an early advocate of the locomotive and especially as the builder of the "Oructor Amphibolis" so frequently illustrated in connection with early efforts at steam locomotion), by means of a shaft passing through a hole in the partition wall.

Thus humbly started a plant which rapidly increased in size and in the reputation of its manufactures, until by the time the Civil War was at its height, it had become one of the foremost of the world, with its engines running in many lands.

This plant suddenly burst into prominence on July 10, 1836, when its locomotive, "George Washington," built a short time before, for the Philadelphia & Columbia Railroad, made itself a name which soon became familiar in every civilized country, by hauling a train weighing 19,200 lbs., to the top of the inclined plane at Philadelphia, at a speed of 15 miles per hour, with a boiler pressure of only 60 lbs., and from a direct start at the foot of the plane.

This performance was especially noteworthy as it had previously been deemed impossible for a locomotive to draw trains up this incline of 2,800 ft. long, and with a grade of 1 in 14, or 377 ft. to the mile. The principal dimensions of the "Washington" were as follows:

Cylinders	10 $\frac{1}{4}$ x 17 $\frac{5}{8}$ in.
Driving wheels (two)	48 in.
Truck (four)	30 in.
Flues	78, 2 in. dia., 84 in. long
Weight, total	14,930 lbs.
Weight, on drivers	8,700 lbs.

The statement has been published that this engine was provided with an attachment whereby a portion of the weight of the tender could be thrown upon the driving wheels when additional

adhesion was desired, but this is incorrect. Such a device was, however, designed and used by William Norris on engines built soon after, but the successful results obtained in this instance were attributed chiefly to Mr. Norris' peculiar method of proportioning and setting his valves.

Published cuts of the "George Washington" showing it as an outside connected locomotive are undoubtedly incorrect and could only have been made from pictures of later engines from which the name had been erased.

The statements of the article so frequently referred to thus far, and which bear evidence of having been obtained directly from the Norris people, inform us that the "Washington County Farmer" was built by William Norris in October, 1836, for the Philadelphia & Columbia Railroad, and was considered an improved type on account of having all connections outside of the frames, that it was Mr. Norris' first engine so built, and that it worked successfully on the Philadelphia plane.

The engine next descended the incline, holding the train with reversed valves; stopping at intervals by admitting steam to the cylinders, and after several of these stops the train was started up the grade again, each time without any difficulty. The descending trips were made in from twelve to fifteen minutes. The engine was put into regular service the next day, and on the 19th of the same month a similar trial to that of the 10th was made, to which the public was invited and which was equally successful, receiving the highest praise from all who witnessed it, especially the practical railway men present.

The same engine soon afterward drew a train of 22 cars containing a gross load of 119 tons, and it was confidently expected that a maximum load of 150 tons would readily be drawn at a speed of from 12 to 15 miles per hour. The statement is made plainly at this part of the article that the "George Washington" was not provided with the attachment used on some other engines to transfer some of the weight of the tender to the engine.

In a letter to the American Railroad Journal, in its issue of December 17, 1836, William Norris states that the "Washington County Farmer" is now in successful operation, and had already drawn a train of 28 cars weighing with their load, 141¾ tons, at a speed of 22 miles per hour over the grades already re-

ferred to, ranging from a minimum of 28 ft. to the mile to a maximum of 47 ft. in the same distance. Mr. Norris also adds that the "George Washington" was at the time of writing, drawing trains daily of from 18 to 25 cars, and had drawn a train of 35 cars, 18 of which were loaded to full capacity, 3 half loaded and 14 empty, the whole composing a maximum weight of 137 gross tons.

The reputation gained by these Norris engines on this plane soon reached the ears of railroad managers in Europe, and as a result of a correspondence begun in 1837, an order for 17 engines similar to the "Washington County Farmer" was received by Mr. Norris from the Birmingham & Gloucester Railway of England. These engines were intended to draw trains up the Lickey incline, which was two miles long with a uniform ascent of one in thirty-seven, or 142 ft. to the mile, and which had previously been worked by ropes attached to stationary engines at its summit. The first four were delivered in 1840, and one of them, the "Philadelphia," a 4-2-0 machine with 10½ in. x 18 in. cylinders, 48 in. drivers, and a total weight of 20,800 lbs., drew loaded trains so successfully up this incline, that after the arrival of the remaining thirteen, orders were immediately placed with Mr. Norris for more of the same type, but these orders were soon countermanded on account of English locomotive builders using influence to obtain a governmental decree forbidding the importation of locomotives into England.

Notwithstanding this very unfavorable action of the authorities in giving the home builders such an advantage, the subsequent attempts of these parties to build engines to do the work on the incline as well as the Norris engines, proved such complete failures in each instance, that the railroad company required other home builders to furnish it with engines which should be exact duplicates of the American machines.

Through the courtesy of Herbert T. Walker, I have been permitted to embody in this article the names and numbers of twelve of these engines built for the Birmingham & Gloucester line by Wm. Norris, comprising the following: No. 6, Victoria; No. 7, Atlantic; No. 8, Columbia; No. 9, Birmingham; No. 12, Washington; No. 13, Philadelphia; No. 14, Boston; No. 15, Baltimore; No. 20, President; No. 21, Gwynn; No. 31, Niagara; No. 32, New York. This list was obtained from an official list in possession of the Midland Railway Co. It contains no dates,

and, as will be seen by the numerical position of the "Philadelphia", the engines evidently were not numbered in their chronological order. It is also singular why no record has been kept of the entire lot of seventeen instead of only the twelve named above.

The closing of England to American locomotives did not cause the railroad managers of continental Europe to withdraw their patronage, as not only were orders afterward sent from these lines and those elsewhere under their control, until by 1855 100 engines had been shipped by the Norris firm to France, Austria, Prussia, Italy, Belgium, South America and Cuba, but in 1844 William and Octavius Norris were especially invited by the Austrian Government to come to that country and take charge of the Government shops near Vienna. This offer they accepted and remained in charge of the Austrian plant during the five succeeding years, introducing their methods and improvements into all departments. They returned to America with many valuable presents received from the Emperor of Austria, Louis Philippe of France and the Czar of Russia.

It will be appropriate to mention in this connection an article contributed several years ago to an American technical journal by Mr. Hermann Von Littrow, of Neustadt, near Vienna, Austria, on the history of locomotives in that country. The author of the article states that in 1838 the Norris firm sold a locomotive to a railway of Austria and accompanies his statement with a perspective view of the engine. This picture shows it to have been almost exactly like the "Lafayette," built for the Baltimore & Ohio Railroad, in 1837, but it bears the name, "Philadelphia." The article then states that the locomotive works of Wenzel Gunther in Neustadt, were established in 1842 and begun work on this American engine (probably repair work is meant), and taking it for a pattern made some larger 2-4-0 engines for use on the coal trains of the Northern Railway, and near the close of the history adds that in 1861 George Sigl, "owner of the ancient Norris Works" at Vienna, bought the Neustadt plant.

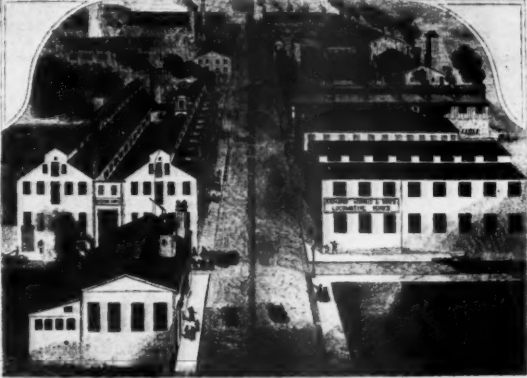
Returning to our records of the plant in Philadelphia, we find that in 1846 Septimus Norris became a partner and the firm name was changed to Norris Brothers, and continued thus until 1851 or 1852. I have seen no records of any Norris engine built during the latter year, but from early in 1853 at the latest, until the final closing of the Philadelphia shops, all badge plates were

inscribed, "Richard Norris & Son," H. Latimer Norris having become a partner.

IRON MANUFACTURE—LOCOMOTIVE ENGINES.

RICHARD NORRIS & SON,
Proprietors of
NORRIS' LOCOMOTIVE WORKS
BUSH HILL, PHILADELPHIA.
Established Jan. 1, 1855.

HEAVY
FORGINGS
IRON
BRASS
Castings



View of Works on Bush Hill and Hamilton Streets, Philadelphia.


CHILLED
ENGINE
AND
Cast Wrought
IRON
Car Wheels.

Trains of work, having been greatly enlarged, and supplied with new and improved Tools, are prepared to execute orders in any quantity, for

LOCOMOTIVES,
Of any Arrangement, Equality or Weight Required.

In design, strength and Workmanship, the Engines produced at these works are offered in competition with any others made in this country. Also

HEAVY FORGINGS,
Such as large Iron Bars, cross and other Heavy Beams, in any form required, and to any size, under 24 inches square or round.



A Heavy Road-Engine Locomotive Engine.

From the magnitude of their establishments, and with a larger variety of shops and appliances of Tools and Machinery than any other Works, they are enabled to meet demands for their work commensurate with their facilities, which are fully equal to TURNING COMPLETE LOCOMOTIVES every six days. Locomotives repaired, and other arrangements.

The whole number of Locomotives constructed at these Works up to January 1, 1866, was EIGHTY.

Published by A. S. FORDMAN.

The facilities possessed by these works for furnishing heavy forged shapes, are believed to be unequalled. Special attention given to the forging of


LOCOMOTIVE FRAMES,
With Pedestals added to; ALSO, OVERHEATING BOILER, and other similar Locomotive shapes, all of which will be accurately forged to dimension or pattern, and warranted to combine and strength.

Wrought Iron Railway Wheels,
For Locomotives, or Express Passenger Cars, and of any size or weight required.

Chilled Engine and Car Wheels,
Of any size, and of Plain or Spoke Form. These Wheels possess an important improvement in the provision made for equal contraction in cooling, thereby the Wheel surface is made to any form.

IRON & BRASS CASTINGS,
Of any weight or pattern, and from the best American Stock.

LOCOMOTIVE'S WORKS,
From Locomotive Boilers, built and worked in any quantity, quantity, and to the generally efficient being.



A Heavy Road-Engine Locomotive Engine.

NUMBERED AND FORTY-THREE, of which number one hundred and SIXTY-ONE were on foreign account, having been shipped to the following countries—England, France, Austria, Prussia, Italy, Belgium, South America, Cuba, &c. The "Comet" is a single locomotive of one engine only; the "Steamer" is the only single locomotive in the Iron World that has been made to run on the other side of the Atlantic.

[For further particulars, see letter-press.]

Published by FERRY & ARNOLD.

REPRODUCTION OF A NORRIS STATEMENT ABOUT 1856

Some authorities state that the plant ceased to build locomotives as early as 1860, but this is certainly an error. I have seen many Norris engines which were built for the Pennsylvania

Railroad and its subsidiary lines in 1862, 1863 and 1864. Twenty-two came out in the last-named year marked "W. T. Co." (Western Transportation Co.), and were intended for service on the Pittsburgh, Columbus & Cincinnati Railroad, when the portion of that line across the Panhandle of West Virginia should be completed and unite the road with the Pennsylvania at Pittsburgh. This did not occur until almost a year after the building of these engines, and they ran in the meanwhile on the Pennsylvania Railroad, and this service in connection with the item of their purchase for the P. C. & C. R. R., is mentioned in the Annual Report of the Pennsylvania for 1864.

Norris Brothers also started the Schenectady Locomotive Works in 1848, but I have no data indicating the time at which they withdrew from it.

After closing the Philadelphia plant, the old Lancaster Locomotive Works at Lancaster, Pa., were taken by Norris Brothers, either late in 1865 or in the beginning of 1866 (I recall a visit to it in August of the latter year, when it was under their control), and thereafter quite a number of locomotives were built at it until about 1868, when shops also were closed. In 1873 the idle shops at Philadelphia were purchased by the Baldwin Locomotive Works, and the name of Norris disappeared from the list of active builders of locomotives. These old shops have ever since been an important adjunct to the great plant of their purchaser.

While loitering recently over the collection on the tables of a second-hand book store, I secured a copy of a work published in 1858 by Edwin T. Freedley, entitled "Philadelphia and its Manufactures," in which appears a very excellent article on the Norris Locomotive Works—at that period about in its prime. This article agrees very closely with that in the *United States Magazine* already referred to; and, like it, states that the Norris works in 1858, manufactured its own tires, tubes, springs, wheels, boilers, etc., using best braziers' copper for tubes (flues), best charcoal iron for the boilers, and iron made from the toughest scrap-iron obtainable, for the other parts. It also states that 1,500 hands were employed in the various independent departments of the works, and that up to that year 937 locomotives had been built by the firm, of which 156 were for foreign lands. In verification of this statement is the fact of the engine "Phleger," bearing construction number 912, having

been built for the Pennsylvania Railroad in 1858, as before mentioned. Mr. Freedley adds that the average output of the works has been about 40 engines per annum, and that in the year 1858 the cost of each engine ranged from \$6,000 to \$12,000, and the weights from 44,000 to 66,000 lbs., with a tendency on the part of the companies ordering, to use the larger sizes. He also states that it was rather difficult to estimate the exact cost of each, as many were paid for in whole or in part, by bonds of the purchasing companies.

The predominant features of the Norris engines built between 1834 and 1853 were the following:

Frames with but few exceptions of bar type; boilers of small diameter with 2-in. copper flues, and semi-circular fire-boxes of same material. Each firebox was surmounted by a hemispherical dome of "haystack" (Bury) pattern, and this dome was in turn crowned by a much smaller one also hemispherical, and usually made of polished brass or copper, which carried the safety-valve on its top. The whistle on many occupied a position in the center of a cup-shaped fitting of polished brass which was attached to the side of the larger dome.

The smokestacks were generally straight at first, but later were provided with various spark-arresting devices, and from about 1848 the balloon type was generally used.

The smoke-boxes were of slightly greater diameter than the boiler, and were square at the bottom which extended a considerable distance below the frames.

The cylinders ranged from 9 in. x 18 in. to 13 in. x 24 in., and generally were placed for outside connections and at quite a steep pitch. They were provided with webs or flanges on their inner sides by which they were bolted to the frames and smoke-boxes. As on all early locomotives, no device was used to enable the cylinder cocks to be opened from the foot-plate.

The steam chests each contained a single valve driven by hooks which at first were of "D" type and were thrown in or out of gear by half-moon cams on the reversing shaft, but this type of hook was soon followed by "V" hooks attached to the reversing shaft arms by eyebars fitted at their lower ends with slotted holes to permit the hooks to properly follow the arc described by the pins of the rocker shafts. On the later engines an independent half-stroke "cut-off" was used. This was actuated on a few of the first engines fitted with it, by an attachment to the

crosshead, but on all that followed it was attached to an additional eccentric on the driving axle, and in either case was forward motion only. The cut-off valve was placed directly on the top of the full-stroke valve.

The earlier of these engines were each carried on a four-wheeled truck and one pair of drivers, the latter with the axle set as close to the front of the firebox as would allow the eccentrics to move properly. Later engines had two pairs of drivers and a few were built with three, but all except a few of those with three pairs used the four-wheel type of truck.

Nothing was jacketed except the barrel of the boiler. It was covered with beaded boards painted and held in place by bands of polished brass.

Cabs, cowcatchers and headlights were "conspicuous by their absence." The sides of the foot-plates were protected by a light railing, and a sort of step depended from the front bumper. Sandboxes also were wanting, but came in about 1846. Many were furnished with bells at a very early date.

The first tenders were small and each was mounted on four wheels. Their size increased with that of the engines, and many then were made with six wheels.

From early in 1853 the Norris engines were built of much larger dimensions, and quite a number had slab frames. On some engines these extended throughout their entire length, but in others only as far as the first driving box pedestal, from which to the rear bumper they were of bar pattern.

Auxiliary outside frames of 1 in. x 3½ in. were on nearly every engine built between 1853 and 1856, but were not applied to later engines. During the same period, the running boards of nearly all of these engines had handrails placed along the outer edges, extending almost to the steam-chests. After that time they were carried forward only to the center of the first pair of driving wheels, and by 1858 did not appear at all and only those attached as now, by brackets to the boiler, were used.

The tenders were also further increased in size, and were generally carried on two four-wheeled trucks of a simple side-bearing pattern.

Green seems to have been a favorite color with the Norris people during almost the entire existence of the firm, as but few of its engines appeared in any other hue. Some of these few were painted a chocolate color throughout, and the 22 W. T. Co.

engines were uniformly a deep black, with lettering and striping in dull buff shaded with Indian red. Vermillion was also used on many of the wheels after 1853, but green was again used about 1858 for those on some engines using more brilliant colors and landscapes on cabs, sandboxes and tenders, with arabesques galore. Highly polished brass was also used profusely after 1853, even lavishly from 1856 to 1860. Until 1856 hook-motion was the standard valve-gear, but about that year the firm began to turn out engines with shifting links, generally, if not entirely, adhered to that form of gear thereafter. The hook-motion gears previously referred to have been illustrated and fully described in the *Railroad Gazette* of August 17, 1906, on pages 141, 142 and 143.

Other noteworthy engines from the Norris plant were:

"Lafayette" was built for the Baltimore & Ohio Railroad Co. in 1837, and was substantially "Washington County Farmer" in an enlarged form, although its drop-hooks were actuated by cams instead of eccentrics, which idea may possibly be attributed to Ross Winans who was then prominent in the locomotive development of that company, and who ultimately used cams to work the cut-off on his "Camel" engines. Both "Lafayette" and "Washington County Farmer" were built on almost the identical lines of "William Penn," illustrated on page 167 of the issue of the *Railroad Gazette* for August 24, 1906.

The "Philip E. Thomas," built for the Baltimore & Ohio Railroad in 1838, was apparently the first Norris engine with four driving wheels, and its construction was probably suggested by the very satisfactory performance of an engine built by James Brooks in 1836 with Campbell's type of boiler, a four-wheel truck and two pairs of driving wheels; and, further, by the excellent results obtained from the use of equalizing bars on the four-wheeled Eastwick & Harrison locomotive, "Hercules," which also used two pairs of drivers in connection with a four-wheeled truck. The "Thomas" had 12 in. x 18 in. cylinders, and aside from the additional pair of drivers and somewhat larger sizes of other parts, was on same lines as "Lafayette."

The "Arrow," a 4-2-0 engine built for the B. & O. R. R. Co., by the Norris plant, in 1839, was at that time considered the fastest locomotive in America. It had cylinders 12 in. x 24 in. and drivers 60 in. diameter.

In the same year another Norris engine, the name of which

I have been unable to ascertain, was regularly drawing trains of loaded cars on the Hudson & Berkshire Railroad, over a portion of the line three-quarters of a mile long with a grade of 154 ft. to the mile.

Another of these notable engines of 1840 was placed on the Boston & Worcester Railroad, and regularly drew trains weighing 151 tons exclusive of the weight of the tender and 37 small freight cars over grades of 30 ft. to the mile.

"Chesapeake," delivered in 1846 to the Philadelphia & Reading Railroad, was the first 4-6-0 engine built by the Norrises, and was probably the first of the type built by anyone. Its cylinders were 14½ in. x 22 in.; drivers, 46 in. diameter, and total weight, 44,000 lbs.

It has been stated in some publications that the unique points of this engine were patented by Septimus Norris, but the only record bearing especially upon engines of the same general type is that of a patent taken out by Septimus Norris on September 26, 1854, and the specifications for which limit his claims to a ten-wheel locomotive having three pairs of driving wheels and a four-wheeled truck, so arranged that only the rear pair of the drivers are flanged, these with the flanges of the swinging truck keeping the engine on the track and permitting freedom in rounding curves. I have seen Norris engines built in 1862 which had small cast-iron plates attached to the bases of the domes, on which were the words, "Septimus Norris' Ten-wheel Patent, etc." It may be stated in this connection that the firm of Rogers, Ketchum & Grosvenor built at least one ten-wheel engine for the Erie Railroad in 1848, which would indicate that Mr. Norris had no patent at that time. In a letter written to me several years ago by E. J. Roush, who was in the service of the Reading road when "Chesapeake" came out, he states that the engine used no center plate on the four-wheel truck, as the weight was all carried on the drivers, but a large pin extended downward through the frame of the truck from that of the engine and thus enabled the machine to be guided around curves. This engine has been frequently illustrated and described in railroad journals.

In 1848 a 4-4-0 engine, designated variously since as "Iowa," "No. 1," "Bob Ellis," and "No. 71," was built for the Milwaukee & Mississippi Railroad, and was the first engine to turn a wheel in Wisconsin. After a long service it came into po-

session of the Chicago, Milwaukee & St. Paul Railway Co., and was finally put out of commission about 1886. The boiler was taken to Waukesha, Wis., and installed in the round-house of the company at that place, where it was still in service in May, 1898, at which time Mr. H. W. Grigg, master mechanic of the Prairie du Chien division of the road, furnished me with the following measurements taken from it, which give an idea of the boilers on the engines:

Diameter of smokebox	40 in.
Diameter of barrel	36 in.
Diameter of dome (Bury)	45 in.
Diameter of flues	2 in.
Length of flues	122½ in.
Number of flues	108
Material of flues	Copper
Length of firebox, inside	39 in.
Width of firebox, inside	35½ in.
Height of firebox, inside	48 in.
Width of water spaces	2½ in.
Length of boiler over all	204 in.

Other dimensions of the engine were as follows:

Cylinders	14 in. x 26 in.
Diameter of driving wheels	54 in.
Centers of driving wheels, apart	66 in.
Total weight of engine	46,000 lbs.
Radius of hooks	69 in.
Rocker centers	Upper, 11 in.; lower, 9½ in.
Spread of cylinders	72 in.
Centers of valve rods, apart	57 in.

The outer side of each pair of guides was elliptical in form and bore in its center, in letters of cast-iron, the inscription, "Norris Works." This is the only instance of such badge plate that has come under my notice in connection with drawings or photographs of Norris engines, or on the engines themselves.

Mr. Griggs has a photograph of this engine which shows its appearance shortly after it was taken from service on the road. While the smokestack, sandbox, cab, truck, tender and a few other parts are those of later years, much of the original engine, including the hook-motion, remains as when first built.

Although the photograph shows but a single valve in each steam chest, worked, of course, at full stroke only, it is probable that an independent half-stroke cut-off was used at first, as these cut-offs were often removed from such engines on a number of roads after the newer and larger machines had relegated them to work trains or yard work.

The "Lightning," a Crampton engine for the Utica & Schenectady Railroad, was also built in 1849 at the Schenectady plant of the company previously mentioned.

The only record I have found of its service is contained in a rather vague statement that it "drew a train of eight-wheel cars at a speed of 72 miles per hour." Its valve-gear was of the stationary link type; its cylinders 16 in. x 22in.; drivers, 84 in., and carrying wheels, 48 in. The latter were so arranged that a portion of the weight could be transferred to them from the drivers on the lighter grades and levels. The engine was handicapped by a small boiler and a lack of proportion between the driving wheels and cylinders, and was only retained in service for one year.

A 4-4-0 engine with 84-in. drivers was also built for the Erie in the same year, and its cylinders were placed immediately behind the smokebox.

In 1850 and 1851 quite a number of 4-4-0 engines were built for the two lines owned at that time by the Commonwealth of Pennsylvania. These were quite similar in general design to "Tioga," but were larger, and used eccentrics on the main driving axle to work the half-stroke, independent cut-off; instead of driving it from the crosshead.

"North Star" was also built in 1851 for the Utica & Syracuse Railroad, and, differed widely from most of the Norris engines thus far considered, having horizontal cylinders, straight dome, Campbell firebox, alligator crossheads and two guidebars placed one over the other. The driving wheels appear to have been of a type that was used later in a number of engines by R. Norris & Son, but the wood filling is unique and did not appear in the later engines. An old engraving of the "North Star" from which my reproduction is made, bears the inscription, "with Septimus Norris' Variable Exhaust Valves." It is a pity that this engraving, like many of that period, is rather limited in detail, as the meaning of the inscription just quoted is not made clear upon it, nor is it easy to ascertain whether the valves were moved by hooks or links. The former is most probable, although but a single valve stem appears on the engraving. A good idea is afforded, however, of Norris' favorite method of arranging driving wheel springs. The wood lagging on the boiler, without an outside metallic covering, will also be noted.

The various features common to the "North Star" and the

"Lightning" might favor a supposition that the first-named also used suspended links.

It will be noticed that the small escape pipe, the Campbell boiler, and the large dome set well forward on the boiler, are alike on both engines.

In 1853, twelve passenger engines, ranging in construction numbers between 628 and 649, were built for the Pennsylvania Railroad. These all had straight boilers, with 39-in. straight domes on the roof sheets, deep fireboxes for wood burnings, springs set almost at the top of the boilers to which they were attached by lugs or brackets at their centers, whistles on independent columns on the waists of the boilers, and all with 16 in. x 24 in. cylinders set horizontally. The driving wheels of three were 72 in. diameter, and those of the rest were 60 in. The frames of the three with high drivers were of slab type throughout at first, while those of the others were slab from the front bumper to the pedestals of the forward driving boxes, and of bar type from that point back. The average weight of all was 58,800 lbs., with 38,000 lbs. on the drivers.

During 1853 and 1854 these were followed by eight 4-4-0 engines for freight service on the Pennsylvania, and two for the Philadelphia & Columbia Railroad of about the same type. These engines differed from the preceding twelve in having the cylinders set at a slight pitch, in using 54-in. drivers on the P. R. R. lot, and in having round sandboxes of almost the same design as used on the standard P. R. R., engines from 1867 to 1881.

In 1854 two 2-6-0 coal-burning freight engines were built for the Pennsylvania Railroad, with 17 in. x 22 in. cylinders, 44 in. drivers, and weighing 55,600 lbs., of which 43,800 lbs. were on the drivers. These were a close imitation of the Smith & Perkins engines which had been delivered to the company a short time before. One of these Norris engines was written up and illustrated in the *Railroad Gazette* of May 4, 1900, so that it will suffice here to refer to the reproduction of an old lithograph of the type, issued by the Norris people at the time, and on which is shown a rather peculiar valve gear that was never applied to the engines; both having the usual Norris "V" hooks and independent half-stroke cut-off shown on the other engines illustrated.

The same year also brought four 4-6-0 freight engines to the Allegheny Portage Railroad, which had the type of valve gear shown on "Nittany," and others. These four had 17 in. x

24 in. cylinders, 49 in. drivers, weighed an average of 62,150 lbs. with 42,100 lbs. on the drivers.

In 1856 two very handsome finished passenger engines of greatly improved design, and with 16 in. x 24 in. cylinders and 66 in. drivers came on the Pennsylvania, and were probably the first Norris engines built with shifting links. This gear was used almost exclusively by the firm thereafter. Four somewhat similar engines were built for the Philadelphia & Columbia Railroad, about the same time, but for freight service. Their cylinders were 18 in. x 22 in., drivers 60 in., average weight 64,550 lbs., about 40,400 lbs. of which were on the drivers. The cylinders of these were not only set at a slight pitch longitudinally, but had valveseats sloping laterally at an angle of about 20 or 25 degrees, while coinciding lengthwise with the pitch of the cylinders. This arrangement must have been required by those in charge of the mechanical department of this division of the state road, as it was followed on all engines built for it from 1853 until its purchase by the Pennsylvania in 1857.

In 1858 the first "Phleger" engines of which I have any authentic record came out of the Norris shops. Some authorities assign 1853 as the year in which the firm began to build this class of engines, and both a woodcut and a colored lithograph have been frequently published, in each of which a Norris "Phleger" 4-4-0 passenger engine with a "Bury" dome, without lagging in the first, and covered with polished brass in the second, is shown. The woodcut also shows an engine without a cab, but having the handrails of early days around the footplate, while the lithograph shows a cab of the type used by the firm from 1856 to 1860, bearing at the top the name, "Wyoming."

Septimus Norris soon after the advent of the Phleger designed a firebox on somewhat similar lines, but I have nothing reliable to show that it ever passed beyond the experimental stage.

In 1862 R. Norris & Son adopted a type of boiler with an unusually long and high wagon-top in which the dome was placed well forward on the roof-sheet. This plan was thereafter followed in the boilers of nearly all engines built by the firm until it closed the Philadelphia plant. It might be mentioned here, that the engines built by Norris Brothers at Lancaster

did not have consecutive construction numbers with those of the older plant, but were numbered in a series of their own, beginning with No. 1.

But few, if any, Norris engines remain in existence. The "Washington County Farmer" with the "William Penn" and one or two sister engines, were sold with the state improvements to the Pennsylvania Railroad in 1857 and appear in the company's report for that year under the head of "out of service." The "Farmer" was probably cut up, and the "Penn" was afterward sold to a private line, where it ran until 1864 or 1865, and later came again into the possession of the Norrises, who partially rebuilt it at Lancaster, as described and illustrated in the *Railroad Gazette* on page 167 of August 24, 1907. In 1898 it was standing idle, but in running order, in San Francisco, California.

Quite a number of these built between 1852 and 1856 for the Pennsylvania Railroad and for the two roads of the commonwealth of Pennsylvania, were afterward rebuilt and remodeled by the Pennsylvania and proved very efficient and attractive machines—some continuing in service until the later years of the seventies, and one, "Monongahela," afterward No. 59, after being so rebuilt in 1861 continued in regular service until the latter part of 1881.

The engines of the Norris works always had a reputation among railway men for speed, although they were generally of rather light construction, and in reading over the annual reports of various companies owning them, one frequently finds under the head of "Remarks" in the performance sheets of engines, "light frames," or "in shop receiving heavier frames." This was especially the case with Norris engines built after 1852, and the boilers of the engines of a still later date were considered by many to be of a somewhat unsafe type of construction. The statement is rather sustained by the following data. About the beginning of 1864 out of 300 locomotives on the Pennsylvania Railroad, 73 were from the Norris plant, and by the end of the next two years, with the equipment largely increased from the shops of other builders, six of the 73 Norris engines had met with disastrous boiler explosions during the preceding eight years, and most of the six were of the later types, while I can find record of but four explosions among the

rest of the equipment of the company as stated, from the opening of the road to the time just named.

In the autumn of 1865, one of the Norris "W. T. Co." engines (No. 18), while in apparently perfect condition and almost new, and with plenty of water, blew the entire wagon-top and dome off its boiler while standing attached to a freight train in the yard at Pittsburgh, but fortunately without injuring any of the crew or of the many employees engaged in various duties nearby. The engine was soon repaired with a new roof-sheet of slightly different outline, but the remaining twenty-one were promptly taken to Altoona Shops and had additional stays placed in their boilers.

The accuracy of much of this article is certainly due to J. Snowden Bell, Esq., Herbert T. Walker, the Baldwin Locomotive Works and the Franklin Institute of Philadelphia, for the use of valuable drawing, publications and other data bearing upon the subject, and without which assistance so willingly rendered, much would have had to be omitted as vague or uncertain. I might also add that since completing the article, I have ascertained from John Baumgardner, of Lancaster, Pa., who was employed as draughtsman with Norris Brothers during their brief stay in that city, that the firm was then composed of Messrs. James, Edwin and Cassandra Norris, with John A. Durgin as superintendent.

The Norris Engines on the Birmingham and Gloucester Railway.

By G. W. BISHOP.

In a former Bulletin I tried to say something about early English engines that went to America, and expressed the hope that someone would reply with some notes upon American engines coming to England. No one having responded, I will endeavor to take up the story myself, and get together some information concerning a classic chapter of locomotive history—I mean the Lickey episode of 1840.

The original survey for the Birmingham and Gloucester Ry., made by Isambard Kingdom Brunel in 1832, lay to the east

of the present route, and had easier grades. Brunel, however, became occupied with Great Western broad gauge schemes, and the Gloucester line remained at a standstill for a time. In 1826 an Act was obtained, and a new survey made by Captain William Scarth Moorsom. This engineer took the line over the Lickey Hills, near Bromsgrove, by a bold descent of 2 miles at 1 in 37. This, then, was the famous Lickey Incline, which has ever since been such a source of interest to railway students. Apparently, the first section of the railway opened was from Cheltenham to Bromsgrove June 24, 1840, with two trains each way daily; but in the same year the line reached from Gloucester to Curzon Street Station, Birmingham, which it shared with the London and Birmingham and Grand Junction Railways. "Muggs' Handbook for Railway Travellers", published 1840, gives the following distances from Birmingham:

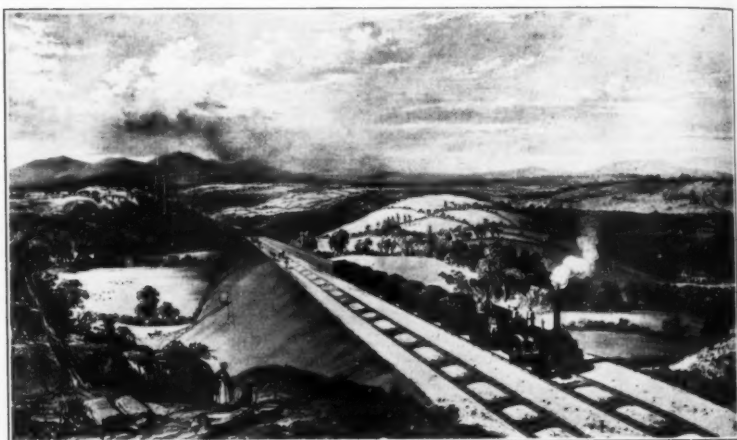
Miles.

- 1¼ Camp Hill (engine depot).
- 3¼ Kings Heath.
- 8 Grovely Lane Tunnel, 440 yards long.
- 12¼ Lickey Summit, 511 ft. above Bristol level.
- 14¼ Bromsgrove (locomotive shops).
- 16¾ Stoke Prior.
- 19¼ Droitwich.
- 25¼ Spetchley.
- 32½ Defford.
- 33½ Eckington.
- 36¼ Bredon.
- 38½ Ashchurch.
- 45¾ Cheltenham.
- 52½ Gloucester.

There was also a branch to Tewkesbury. At Gloucester the line met the curious "Gloucester and Cheltenham Tram-road", dating from 1809. This was at first worked by horses, and later by engines built by Tregellas Price, of Neath.

People were dubious about the Lickey, but Captain Moorsom had had experience with steep inclines in America, and expressed his intention of importing engines from the U. S. A. which would surmount the incline without difficulty. This, in fact, was what very soon happened, for eight engines were

ordered from the celebrated firm of Norris & Co., Philadelphia, of standard design. Mr. Chas. E. Fisher has kindly arranged for the history of the Norris Works to be dealt with separately. The first four engines duly arrived, in 1840, and appeared in the B. & G. list as Nos. 5 "England", 7 "Atlantic", 8 "Columbia", and 13 "Philadelphia". There is reason to think that "Philadelphia" was the first actually to arrive upon the line and very likely the first to be under steam. This is supported



The Philadelphia Engine Ascending the Lickey Incline Plane, Rising One in 37, with a Train of Loaded Wagons Weighing 74 Tons.

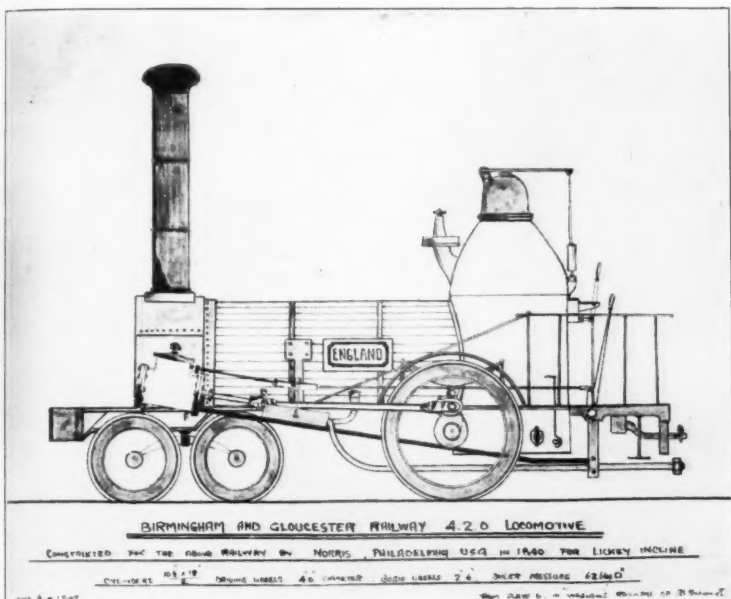
by the fact of this particular engine appearing in the old print here reproduced.

Details of these locomotives are scattered and fragmentary, but the following dimensions can here be given:

Driving Wheels: 4ft.
 Bogie Wheels: 2ft. 6ins.
 Cylinders: 10½x18ins.
 Pressure: 62 lbs. per sq. in.
 Tubes: 8ft. long, 2ins. in diameter, 78 in number.
 Engine weight, empty: 8 tons.
 Engine weight, full, 9 tons 11½ cwt.

Tender weight, full, 6 tons $4\frac{1}{4}$ cwt.
 Height of chimney top: 12ft. 9in.
 Height of boiler top: 6ft.
 Length of engine: 18ft. 4in.
 Wheelbase of engine: 9ft. 4in.

We should classify them now as 4-2-0. It seems clear that they were the first genuine "Bogie singles" to run in Great



Britain. Earlier engines built in England or Scotland had bogies, it is true, but they were trailing, not leading. The Norris singles may be regarded, one may surmise, as the ancestors of the 4-2-2 type, that afterwards had such a tremendous vogue in Great Britain. The addition of trailing wheels would be all that was necessary to produce the type.

A few months later some more examples followed the pioneer four. These were Nos. 6 "Victoria", 9 "Birmingham", 12 "Washington", 14 "Boston", 15 "Baltimore", 20 "Presi-

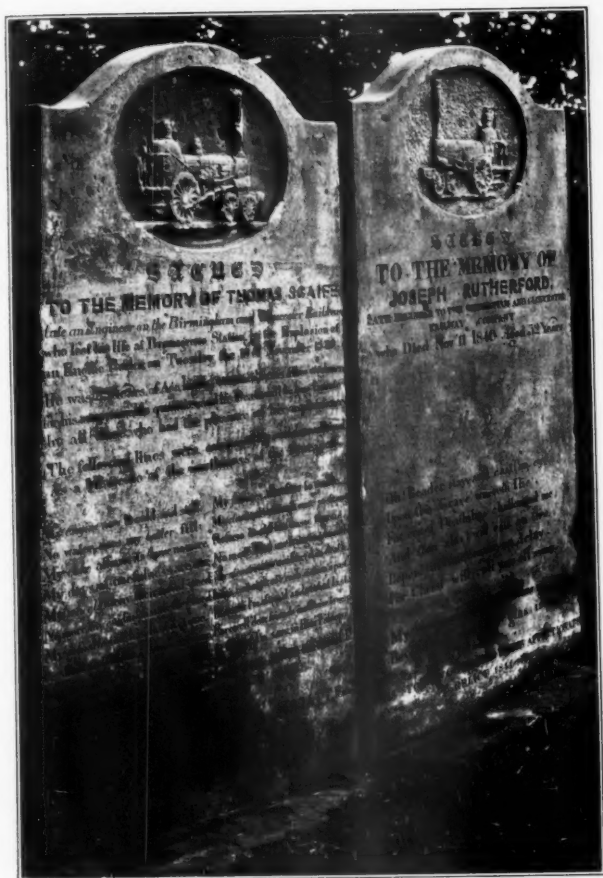
dent", 21 "Gwynn", 31 "Niagara", and 32 "New York". There is some doubt concerning No. 21 "Gwynn"; it is thought she may originally have been No. 5 "England", renamed after Mr. Gwynn, who brought the engines across. If this was so, the total number would be twelve. There were two orders placed, each for eight engines, but what became of the remaining four I cannot trace. The later ones evidently had $11\frac{1}{2} \times 18$ in. cylinders.

Anyway, the engines were successful on the incline. Edward Bury, the famous London and Birmingham Ry. engineer, sent his engine "Bury" to challenge the Americans on the grade, but she stuck hopelessly, half way up. One of the $11\frac{1}{2}$ in. series was lent to the Grand Junction Ry., probably being transferred at the joint station at Birmingham. She made some good trips between Birmingham and Liverpool, which would involve running over part of the old Liverpool and Manchester Ry.—another historic touch.

Stretton's "Development" gives the following figures of the engines' performances:

- (1). The $10\frac{1}{2}$ in. class, ascending the Lickey grade:
Load 33 tons, speed 12 to 15 M. P. H.
Load $39\frac{1}{2}$ tons, speed $10\frac{1}{2}$ M. P. H.
Load $53\frac{1}{4}$ tons, speed $8\frac{1}{2}$ M. P. H.
- (2). The $11\frac{1}{2}$ in. class, on the Grand Junction Ry.:
Load 100 to 120 tons, on 1 in 330 grade, speed 14 to $22\frac{1}{2}$ M. P. H.
Similar load, on 1 in 177 grade, 10 to 14 M. P. H.
Average of seven journeys, gross load about 100 tons, showed consumption of 50 lbs. coke per mile, and evaporation of 4.27 lbs. water per 1 lb. coke.

In Bromsgrove Churchyard are two tombstones to the memory of two B. & G. Ry. enginemen, Thomas Scaife and Joseph Rutherford, who were killed by an engine boiler exploding at Bromsgrove Station Nov. 10, 1840. Each stone carries a finely-detailed carving of a Norris engine. That to Thomas Scaife includes some verses which are so quaint that they deserve repetition:



THE BROMSGROVE TOMBSTONES.

My engine now is cold and still,
No water does my boiler fill:
My coke affords its flame no more,
My days of usefulness are o'er.

My wheels deny their wonted speed,
No more my guiding hand they need.
My whistle, too, has lost its tone,
Its shrill and thrilling sounds are gone.

My valves are now thrown open wide;
My flanges all refuse to guide.
My clacks, also, though once so strong,
Refuse to aid the busy throng.

No more I feel each urging breath;
My steam is now condens'd in death.
Life's railway's o'er, each station's past,
In death I'm stopp'd, and rest at last.

Farewell, dear friends, and cease to weep;
In Christ I'm SAFE, in Him I sleep.

It would be interesting to know the fate of the gallant hill-climbers. The B. & G. Ry. was absorbed by the Midland Ry. in 1864, and some of the English-built engines were renumbered in that Company's list; but I do not think there is any evidence to show whether the Americans were similarly treated.

An engine that may be regarded as a forerunner of the Lickey engines, and having similar dimensions, was the "Washington County Farmer", built in 1836 for the Philadelphia and Columbia R. R. The success of this locomotive reached the ears of the managers of European railroads.

I would express my grateful thanks to Mr. Chas. E. Fisher and Mr. C. L. Winey, in the U. S. A.; and to Mr. A. R. Bell, Mr. J. W. Smith, and the London, Midland and Scottish Railway Co., in Great Britain, for their cordial assistance in compiling these notes.

A Century of Railroads.

Nothing more spectacular in the way of pageants has ever been carried through or conceived than the one with which England has just celebrated the running of the first railroad train from Stockton into Darlington 100 years ago. From a great area provided with grandstand accommodations a vast crowd of spectators witnessed, first a series of tableaux, then what has been called "the most extraordinary procession of locomotives the world has ever seen." In the pictures were shown the development of human industry and engineering from their beginnings in the remote ages. One tableau presented hairy, primitive men fashioning the first wheel from the tree with flint and fire; another visualized Pharoah on a wooden platform drawn by slaves. Then ancient, skin-clad Britons took up the story, and it was carried through the later centuries

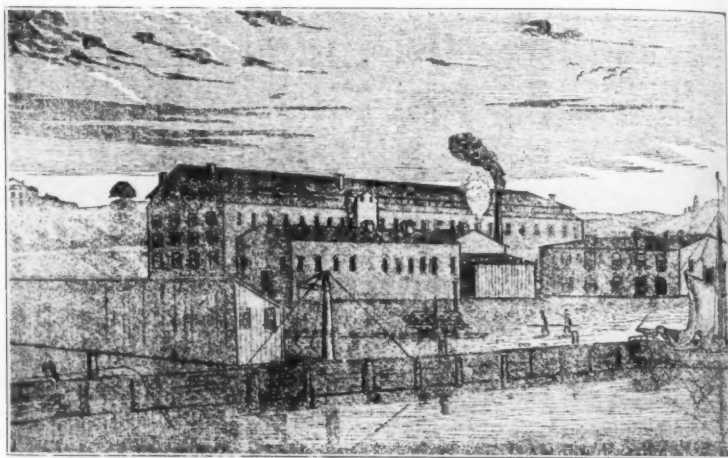
down to the time when George Stephenson mounted his engine on wheels.

Thereupon followed six miles of history on wheels. First on the line was a Hetton colliery locomotive of the year 1822; next came the "Derwent," built in 1845, and further on the first goods engine turned out in 1867. Fifty other locomotives were included in the procession, representing in their development all the great railways in the country and utilizing electrical as well as steam power, one of them with a driving wheel eight feet six inches high. And at the close appeared "Locomotion No. 1"—not a replica constructed for the occasion, but the century-old engine dragging rude carriages on whose benches were seated men and women dressed to personate those to whom Stephenson gave their first experience of travel by steam a century ago. The speed was not more than a dozen miles an hour, yet as of yore a top-hatted man rode ahead on a white horse, waiving the red flag of danger. And while the train passed photographers took snapshots of passengers wearing the ancient beaver hats, the poke bonnets, the lace shawls and all the frills and flounces of 1825.

One feature of the spectacle was the enthusiasm which it called forth. Members of the royal family, earls, counts, bishops, legislators and presidents of railroad companies all joined in the cheering. Both Darlington and Stockton were inundated with trade unionists, members of friendly societies, boy scouts and girl guides. At Stockton the Duke of York unveiled a tablet indicating that in a small two-storied house at St. John's Crossing the first railway passenger ticket in the world was issued in 1825. Packed in the streets, crowding the windows and perched on the roofs, the people are said to have "cheered themselves hoarse" during the ceremony. There were no formal speeches, but the lesson of the pageant was well expressed by one spectator who called it a reminder that the wheel never stands still and that there is yet abundant work for the hands and brains of George Stephenson's disciples all over the world. —From the "Boston Herald."

Poughkeepsie Locomotive Works.

In connection with his interesting account of the engines on the Long Island Railroad, Mr. Stuart mentions the locomotive "John A. King", built by the Poughkeepsie Locomotive



Works. The reproduction here is made from an old wood cut showing the plant at that time and from Mr. Stuart's remarks, it appears that this was the only engine ever built by this concern.

In the list of locomotives built by the Portland Co. will be found the "Lady Elgin", built in June 1852, No. 33. The following account of this locomotive appeared in the "Evening Telegram" (Toronto) and may be of interest to our members:

"The 'Lady Elgin' was the first locomotive ever used in Ontario. It was owned by the Ontario, Simcoe & Huron Union Railway, which afterwards became the Northern & Northwestern Railway, and finally part of the Grand Trunk Railway system. The engine was brought by rail to Oswego, N. Y., from Portland, Maine, where it was built in 1852, and brought across Lake Ontario by schooner in parts. This schooner landed at Queen's Wharf at the foot of Bathurst Street, and the 'Lady

Elgin' was put together in a small temporary shop, located about where Mathews-Blackwell Co.'s abattoir now stands. A temporary railroad was built up on to the street level and the 'Lady Elgin' was taken there under her own steam. The Ontario, Simcoe & Huron Union Railway originally ran on the street level of Front Street, the lake at that time covering what is now known as the Esplanade.

The engine was used in construction work, had what is known as hook motion, the reverse lever having only three positions—forward, center and back. It was very light and not capable of handling a very heavy load. After a few years service on the road it was sent to Collingwood, and was used as a switch engine, until the gauge was changed from 5 feet 6 inches to the present standard 4 feet 8½ inches.

A man named John Babbitt was sent by the firm who built the 'Lady Elgin', to superintend putting it together. This man was afterwards an engineer on the Lake Shore & Michigan Southern, running between Cleveland and Toledo. The engine was first run by William Hockett, an English engineer, who shortly afterwards left for the United States."

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Century of Railroads.

The Society has half a dozen complete sets of the first ten bulletins that can be furnished to our members upon receipt of price, which is \$10.00 per set. Single copies of Nos. 3-10 can be furnished upon receipt of \$1.00 per copy.

In Memory of
GEORGE M. BASFORD,

17 East 42nd St.,

New York, N. Y.,

who died Monday, Oct. 26, 1925.

